JPRS-UMA-94-023
6 June 1994

FOREIGN
BROADCAST
INFORMATION
SERVICE

JPRS Report

Central Eurasia

Military Affairs
MORSKOY SBORNIK
Nos. 1 & 2, 1994

Central Eurasia

Military Affairs

MORSKOY SBORNIK

Nos 1 & 2, 1994

JPRS-UMA-94-023 *6 June 1994*

CONTENTS

[The following are translations of selected articles from the monthly journal of the Russian Naval Fleet, MORSKOY SBORNIK, Nos 1 & 2, 1994.]

Time and the Navy

Summing Up the Results of the Past Year and Looking to Next Year

94UM0389A Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 3-9

[Article by Admiral F. Gromov: "Summing Up the Results of the Past Year and Looking to Next Year"]

[Text] Thanks to fundamental changes in the domestic and foreign policies of the world's leading countries and the expansion of their political and economic cooperation, the current military political situation is characterized by a reduction of the probability of nuclear missile war and also of a large-scale armed clash using conventional weapons. At the same time, the danger of the outbreak of military conflicts in individual areas of the world and on Russia's southern borders remains, including on the territories of the former Soviet republics. Its basis has economic, social, political and religious roots.

While taking into account the current trends of the development of the military political situation, the leading countries of the West and East are examining the goals of their foreign policies, their international obligations, military doctrines and strategies. In the process, primary emphasis is being made on ensuring regional security and preventing crises in various regions and a special role is being assigned to naval forces with the implementation of a thorough review of the concepts of their structural development and employment.

The Russian Navy is totally engulfed by this process. The missions of the fleets in peacetime and wartime have been more precisely defined, the Navy's composition and effective combat strength is being reduced, new methods have been developed for manning the fleets with highly professional cadres, a series of measures is being conducted to improve the organizational structure of combined formations and formations, and the development of new elements for basing them on the country's territory. A great deal of work has been accomplished while substantiating the prospects for development of both the Navy as a whole and also the component services that are part of it. Views on the operational employment and training of the fleets have changed substantially. The scope of the measures being conducted and the sequence and duration of their accomplishment have been made more precise. Specific implementation of these plans will depend to a significant extent on the stabilization of the economy and budget appropriations for the development of the Navy.

Confidence-building measures continue to be strengthened between the navies of Russia and other countries. Reciprocal visits and joint training for missions at sea attest to this. Last year, detachments of our ships visited ports of the United States, Canada, Great Britain, China, France, Norway, Germany, Denmark, Turkey, and South Korea. Joint tactical exercises were conducted with the navies of Canada, the United States and Great Britain, some of them with the accomplishment of combat drills and the employment of weapons. These cruises had not only political significance but also promoted the further improvement of the naval proficiency of the crews of our ships.

The missions assigned to the Navy in 1993 on the whole have been accomplished. In the complex conditions of the reorganization and limited financing of the Navy, we have managed to maintain the specified level of combat readiness of the fleets' primary combined formations and formations, their capability to carry out the transition from a peacetime to a wartime footing in a timely and organized manner and to accomplish primary operational missions within the established time periods.

Despite the difficulties associated with manning crews and maintaining the technical readiness of ships, the intensity and effectiveness of the combat service and alert duty performed by them has increased somewhat. Strategic missile submarines have patrolled in designated areas and have carried out alert duty at basing areas in readiness to accomplish assigned missions. General purpose forces have ensured their ability to resist the enemy and have monitored the reconnaissance activity of foreign naval forces. Pacific Fleet ships successfully accomplished assigned missions in coordination with the multinational forces in the Persian Gulf, demonstrating Russia's support of the UN sanctions with regard to Iraq and the Black Sea Fleet in part rendered assistance to Georgia in the stabilization of the situation at Poti.

Operational, mobilization and combat training measures were more intensively conducted last year. The practical skills of command authorities and staffs in the command and control of forces and techniques for the operational employment of forces in combined arms and strategic operations to repel an enemy aerospace attack were rehearsed in these measures. Command and staff map exercises, joint command and staff and staff training without the involvement of marking forces were the primary methods for conducting operational and mobilization training. This permitted us to maintain and improve the practical skills of operational echelon commanders and staffs in the command and control of forces but, at the same time, it resulted in a reduction of the number of times ships put to sea and the number of flights of aircraft which had a negative impact on the level of naval and air skills of some of the forces.

In 1993, combat training of Naval forces was conducted on the whole according to plan: intensively and rhythmically. The combined formations and formations commanded by Captains 1st Rank S. Simenenko, V. Shchegolev, V. Krikunov, N. Temerev and the submarines commanded by Captains 1st Rank V. Zakharov, A. Yefanov and Captain 2nd Rank V. Kvasov achieved the best results.

At the same time, we did not manage to attain an appreciable improvement in combat training. In individual formations and units, exercises and training classes were conducted at a low organizational-methodological level and did not completely ensure the qualitative rehearsal of specific functional duties for the maintenance of the high combat readiness of subordinate forces and for the effective accomplishment of combat training missions by them. Little attention was devoted to the search for and mastery of new technical techniques for the employment of forces. Passive forms of training, without the utilization of shore-based simulators and training classes, frequently predominated in training. Required measures were not undertaken to intensify combat training by improving the methodology for conducting exercises, drills and training classes.

Last year, the fleets were compelled to adjust combat training plans toward the reduction of the number of missions and combat drills due to the lack of an adequate quantity of fuel, lubricating oil, ship maintenance support, and also due to the failure to take into account the specific nature of combat training under conditions of a drastic reduction of financing, material and technical support, and undermanning of ship crews.

All of this required commanders of all levels to drastically increase the level of attention to base training, including the conduct of organizational and tactical assemblies, base, staff and command and staff map exercises, preparatory tactical exercises and other forms of training. However, established procedures for conducting formation base exercises were frequently violated, especially in the Pacific Ocean and Northern fleets which did not permit them to completely take advantage of existing capabilities to rehearse command and control organs and ship combat crews while accomplishing their assigned missions.

Under conditions of a severe shortage of fuel and the reduction of allotted overhaul periods, stricter requirements should have been made of planning for the accomplishment of missions by ships at sea. Each time ships put to sea should have been utilized with the maximum effectiveness, with mutual support by the various fleet component services of the rehearsal of their own missions and the comprehensive employment of weapons. But these requirements have not yet become a mandatory standard in all of the fleets. So, last year in the Pacific Fleet, ships put to sea to accomplish 1-2 drills—without the utilization of the capabilities of supporting and coordinating forces. Comprehensive combat training was organized somewhat better in the Northern and Black Sea fleets.

In 1993, naval aviation successfully began to master the Su-27k ship-based fighter aircraft and accomplished combat service missions with high indicators. We can note a change for the better in Northern Fleet Air Force units where Colonels I. Bokhonko and N. Levchenko are the commanders. Pacific Fleet Air Force antisubmarine warfare personnel led by Colonels V. Uvarov and A. Akhmedyanov, and Baltic Fleet Air Force antisubmarine warfare personnel led by Colonel N. Somov achieved good results.

However, the low supply of new aircraft, spare parts for them, aviation fuel and other material technical resources to fleet air forces resulted in a reduction of crew flying hours, disruptions of combat training plans and, as a result—to the reduction of the level of unit combat readiness and flight safety. The most serious situation developed in the Black Sea Fleet Air Force and, first and foremost, as a result of the unresolved issue on the status of this fleet.

The Naval coastal defense troops successfully mastered new techniques for conducting battle and prepared for operations as part of an airborne-maritime assault force echelon, for the defense of important fleet facilities and sections of the sea coast that are accessible for maritime assault landings in coordination with other naval forces and Ground Forces formations.

Despite the objective difficulties associated with the involvement of troops for the accomplishment of uncharacteristic missions and significant undermanning, combat training plans were largely accomplished in all formations and units. Combat training in the naval infantry formation which Colonel A. Smolyak commands was conducted in an intensive and qualitative manner. The artillerymen under the leadership of Colonel N. Kumshatskiy and the naval infantrymen where Major V. Novikov is the commander achieved good results. The missileers under the leadership of Colonels A. Zabavin and S. Kazachukhin successfully accomplished all combat drills. Combat training missions were not accomplished as well in the formation which Colonel Ye. Kocheshkov commands where omissions in the organizational work of officer personnel became the cause of inadequate preparation of command and control organs and the low firing proficiency of personnel.

On the whole, operational, mobilization and combat training missions were accomplished in a more qualitative manner in the Northern Fleet last year.

The unresolved issues of ship repair, maintenance of engineer networks, lines of communication and providing basing areas with technical resources, a portion of which has exhausted prescribed time periods and is physically and technically obsolete, had a negative impact on the course of fleet training.

The accident rate of combatants and ships in the fleets still remains high. But then again, equipment failures make up approximately 60% of that total number, the primary causes of which are: the low organization of service, weak special training of personnel and failure to accomplish the requirements of manuals and operating instructions. Quality remains low while conducting maintenance and preparing ships to put to sea, personnel violate explosive and fire safety requirements while conducting potentially dangerous work and the quality

of work of permanent ship commissions at individual formations is poor while examining ships' hulls, equipment and systems.

In the fleets, the role of staff specialists has been reduced in the support and maintenance of the technical readiness of ships. They are permitting leniency in the accomplishment of maintenance inspections and they are not taking timely steps to eliminate malfunctions or to increase the level of personnel maintenance training. The internal resources of formations and ships are not being completely utilized to conduct qualitative scheduled-preventive maintenance and inspections.

The Pacific Fleet formation that Rear Admiral A. Klimenok commands had the most unsatisfactory accident rate last year.

The accident rate associated with ship command and control was not reduced. Half of the accidents of this type occurred in the Black Sea Fleet.

The moral-psychological state of Navy personnel is assessed as stable. The situation on ships and in units is controlled and manageable, although it remains complicated. Despite unfavorable trends, the majority of military collectives are distinguished by the appropriate observance of regulations, discipline, and the healthy cohesion of all categories of servicemen that permits on the whole the successful accomplishment of missions and maintenance of the combat capability of naval forces. This was largely promoted by the personal exemplariness of the absolute majority of commanders and superior officers in the execution of their service and military duties, by the certification of officer personnel that was conducted and by the transition to contract service that has been initiated.

Nonspecific work on the implementation of measures of socio-legal protection of servicemen, which has a negative impact on the moral-psychological state, the mood and conduct of officers, army and navy warrant officers, petty officers and sailors, is a serious shortcoming in the organizational and educational activity of commanders, staffs, and personnel organs. As a result, quite a bit of tension, contradictions, and negative trends, which undermine the foundation of military service—discipline, observance of regulations, and law and order—are being maintained in military collectives and are having a pernicious influence on the overall level of military discipline. In 1993, they did not manage to resolve the problem of reducing the number of crimes. Incidents of deaths and trauma of servicemen as a result of the violation of safety measures and also suicide are not being reduced. Evasion of military service and failure to return from leave has become widespread. A vicious trend has developed toward the lessening of work with subordinates by certain ship, unit and subunit commanders who have begun to think that orders or articles of regulations can carry themselves out without the commanders' participation or monitoring. In today's situation, commanders are required to increase their organizing role in the mobilization of all personnel toward the exemplary accomplishment of their military duty and the successful accomplishment of assigned missions.

Last year, the Navy did not manage to create an integrated training and education system of subordinates with the active inclusion in it of all organs of military command and control and the educational structures. Ties are being slowly restored with the local authorities, veterans and youth organizations, creative unions and institutions of culture. Teaching the practice of educational work of commanders and superior officers of all levels, staff and service specialists is sporadic in nature and is inadequately targeted toward accomplishing specific combat training missions and strengthening military discipline.

We have noted the accomplishment of a series of priority measures to provide social protection of personnel in the Navy. So, with a total number of homeless of approximately 30,000 men, we planned to build 6,945 apartments and to obtain 344 rooms in dormitories, using resources allocated for capital construction. Furthermore, we proposed obtaining 1,254 apartments from the local authorities through shared participation and the purchase of 490 finished apartments. We also counted on introducing into operation a 534-seat school, two kindergartens for 1,300 people, four cafeterias with a 955-person capacity, seven boilers, three water treatment facilities, and a number of other facilities. However, inadequate and uneven financing permitted us to accomplish only 72% of our plans. Therefore, in 1994, the Navy has approved the task to obtain approximately 11,500 apartments through our own construction and shared participation.

Summing up the results of the last year, I must note that, despite the objective and subjective causes of an economic and socio-legal nature, the Navy on the whole successfully accomplished the primary mission—maintenance of the prescribed combat and military readiness.

The Russian Navy faces complex and responsible missions in the new year—1994.

In combat readiness. Primary efforts must be concentrated on the maintenance of the composition and state of naval strategic nuclear forces at a level that ensures the guaranteed accomplishment of the assigned missions under any conditions of the situation. General purpose forces are required to be maintained in a state that permits repelling aggression on a local or regional scale from the ocean and sea axes.

As before, combat service and alert duty for the timely detection of an armed attack that is being prepared or a threatening development of the situation and taking the steps required to increase the combat readiness of the fleets remain the primary methods for maintaining high force combat readiness.

Using all organizational and technical measures, we need to exclude a surprise attack, ensure the effective conduct of reconnaissance, the timely increase of force readiness and force deployment, and the capability to put a stop to aggression in the shortest period of time.

We must consider the comprehensive development of the organization of the transition of the fleets from a peacetime to a wartime footing while taking into account the various variants of the development of the situation to be the most important direction for the improvement of combat readiness. When this mission is being accomplished, we need to strive for the precise organization of work of the command and control organs and the coordinated accomplishment of planned measures to bring the forces up to the highest levels of combat readiness at all levels and to eliminate deficiencies revealed based upon 1993's results. Taking into account the intensive conduct of approved organizational measures and the reduction of the strength and composition of the fleets, we need to continuously take into account these changes and take the appropriate steps in a timely manner to support and maintain the prescribed level of combat readiness.

Senior commanders, commanders and staffs must continuously track and operationally react to changes of the military-political situation in the sea and ocean zones and seek rational ways to increase the effectiveness of the employment of forces in operations and combat operations when aggression is unleased.

In the context of implementing the Russian Federation Law "On the RF State Border", the Navy needs to carefully study the development of a system for the protection of the Russian state border in the underwater medium using Naval men and equipment to begin its practical inspection.

We need to accomplish a series of missions for the qualitative renewal of the ship complement, arms and military equipment, the reduction of the numbers of types, and the improvement of ship basing conditions and all types of support. Work will be continued on the infrastructure of the Baltic and Black Sea fleets and Caspian Flotilla forces at new basing locations on Russian Federation territory, and also for the withdrawal of weapons, ammunition, and materiel from Latvia, Estonia and Belorussia [Belarus].

The rapid mastery of new ships, aircraft, helicopters, and modern types of arms and military equipment that are coming into the inventory is an important mission for the fleets.

During the accomplishment of operational training missions, the main efforts must be concentrated on the qualitative accomplishment of planned measures and support of the readiness of senior commanders, commanders and staffs for the command and control of forces while preparing and conducting operations and combat operations. We must devote special attention to the elaboration of the organization of coordination of naval forces with the formations and combined formations of the other services of the Armed Forces, the study and research of issues of the operational employment of naval forces in armed conflicts, local wars and emergency situations.

We must conduct the improvement of operational readiness methodology based upon the broad introduction and intensive utilization of computers and automated troop and weapon command and control systems and equipment. We need to step up the elaboration and introduction of computer games in the practice of command and control organ training, increase the quality of training and the conduct of exercises, training and classes, and strive toward a comprehensive approach to the conduct of all of its measures. Conduct operational-tactical and command and staff exercises simultaneously with several combined formations that are accomplishing joint missions in accordance with their operational designation and that are operating in one zone (area). In the process, when planning operational and combat training measures, take into account the economic and financial aspects of their conduct and, based upon the results of each of them, carry out an analysis and, when necessary, conduct adjustments of plans and their guiding documents in the prescribed manner.

When accomplishing combat training missions, we need to continue to improve the preparation of formations and units for combat operations as part of formations of varied forces, the search for and mastery of new effective tactical methods for their employment. Work out the formation and deployment of formations, the organization of support for their capability to resist the enemy, all types of defense, the tactics of conducting naval warfare with enemy ship formations with the support of the Air Force, fleet BRAV [Coastal Missile and Artillery Troops] and PVO [Air Defense] fighter aviation formations.

We must target the training of various component services' antisubmarine warfare forces on the improvement of the techniques for search, tracking, and destruction of submarines, comprehensive employment of all types of antisubmarine warfare weapons with the utilization of acoustic and non-acoustic search systems.

At tactical exercises, we need to continuously practice operations of ship and aircraft reconnaissance-strike groups to conduct reconnaissance, transmit target designation to strike forces, and also work out the comprehensive employment of EW [Electronic Warfare] systems, camouflage and other types of support.

Comprehensive training at sea, which must be anticipated by precisely developed, full-fledged and strictly monitored base training, must become the primary combat training method. We need to organize it in such a way that we ensure a full training load for shore-based simulators, ranges and training classes and utilize to the maximum extent possible the capabilities of command and control systems, weapons systems and technical

systems of ships for the practical training of crews. We need to improve the organization of combined formation base exercises.

All of these measures must pursue one goal—to prevent the reduction of naval combat training, ground forces field training and flying combat training for personnel.

Maintenance of ships, aircraft, weapons and technical systems at constant readiness and mobilization of all personnel to maintain their area of responsibility in a serviceable and combat ready state must become a constant concern of commanders and staffs during the course of combat training.

We must direct scientific research in the Navy toward the formation and conduct of a rational military-technical policy, the primary content of which, under conditions of the restriction of resources allocated for defense needs, is the conduct of measures directed at maintaining the combat potential of Russia's navy at a level that ensures the accomplishment of the assigned missions.

In the near future, our scientific institutions must concentrate their efforts on:

predicting the possible nature of armed combat at sea under new conditions, substantiation of strategic concepts, methods and techniques for the employment of fleet forces to defend the state from the sea and ocean axes;

developing techniques to prepare for and conduct operations and combat operations independently and in coordination with the other services of the Armed Forces, organizing command and control of forces and their comprehensive support;

substantiating the prospects for the structural development of the Navy, determining new ways for its development at the current stage, developing proposals for the reformation of structures, reducing the effective combat strength of the fleets, and improving combat and mobilization readiness under conditions of the reduction of the Armed Forces and their restricted economic capabilities;

researching the overall appearance of Naval weapons systems and the principles for its technical equipment that ensure the accomplishment of changed missions while taking into account the actual capabilities of industry; developing scientifically-substantiated operational-tactical requirements and military-economic substantiations of required changes of weapons systems and proposals for the adjustment of the primary directions of development and Naval weapons programs, draft NIOKR [scientific research and experimental design work] plans, basic and exploratory research;

substantiating the principles of the reduction of the VVT [weaponry and military hardware] list, time periods and expenditures for their development through standardization; determining priority NIOKR while taking into account the need for priority development of command and control, reconnaissance, and target designation systems;

developing modern mathematical model systems of operations and combat operations of naval forces and the introduction, on this basis, into practice of computer games methods for the operational and combat training of command and control organs and forces.

Training of scientific cadres requires special concern because they are the primary echelon in the new developments and the bearers of new ideas and knowledge. During this unstable period, it is important to not lose that scientific potential which exists in the Navy.

During the organization of socio-state training, primary efforts need to be concentrated on the formation and improvement of the professional knowledge of personnel, the moral-psychological qualities and readiness to defend the Fatherland, loyalty to the military oath, discipline, pride and responsibility for being a part of the Russian Navy that has a heroic 300-year history.

We must more completely utilize the classes in this type of training to teach psychological-pedagogical and legal knowledge and skills to military cadres. We must introduce the most active democratic, demonstration and emotional in impact types of teaching into the training process.

In the new training year, we must target educational work on ensuring moral-psychological stability and discipline of all categories of personnel, maintenance of the cohesiveness of military collectives, and strengthen servicemen's readiness to fight toward the accomplishment of tasked missions. In the process, we need to require from all cadres involved in the sphere of education maximum sensitivity and efficiency in reacting to fluctuations in the moods of servicemen, flexibility in the selection of methods and techniques to affect those moods, and to consider the specific nature of each category of personnel, each group and each individual.

The leading military collectives—ship, company, battery—must be the center of application of education efforts.

We must more boldly introduce into the educational process the ideological position, oriented first and foremost on patriotism and professionalism, loyalty to constitutional duty, responsibility for the entrusted task, and the dignity and honor of a soldier and citizen.

We need to use all forms of organizational and education work to strive to increase in every possible way the responsibility of each official for the state of military discipline and the state of affairs on ships, in military units and subunits, and the effectiveness of employed measures for the prevention of accidents, crimes and deaths of people.

We must consider the primary mission to be rooting out derision and harassment, crimes of insubordination,

evasions of military service, outrages with regard to the local population, and thefts of state and military property, especially small arms; prevention of the death and traumatism of servicemen, accidents and catastrophes of military equipment and weapons.

Daily concern about material-everyday life support of personnel, medical service, and cultural relaxation of servicemen and their family members; the study of urgent problems, needs, and requests of subordinates and their timely resolution must be one of the main directions of activity of commanders of staffs, personnel organs, and of all officer cadres.

We must carry out the selection and assignment of officer cadres while considering the results achieved in the certification process. We must resolve personnel issues in a timely manner at all levels, while ensuring augmentation of leading cadres with trained and promising officers, admirals and generals, and the maintenance of continuity in leadership. Improve work with junior officers. Take steps to eliminate the reasons and conditions that cause junior officers to submit requests on their desire to be released from active military service.

In the sphere of military cooperation, we must consider the following to be priority directions: the development of cooperation with all CIS countries while proceeding from the need to strengthen collective security; the development of ties and the deepening of relations in the military sphere between states and their armed forces; development of a unified military-technical policy; and, coordination of coordination and cooperation in the defense industry sphere.

The most important results of work in 1993 and the missions for the new training year have been revealed in this short article.

I am confident that naval personnel will accomplish the assigned missions with dignity and honor. To do that, we need to work with a complete output of effort, to continuously learn, and to strive for high end results of work on the entrusted sector of service activity.

Russia's Khvalynskoye Line

94UM0389B Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 10-12

[Article by Captain 1st Rank Ye. Privalov: "Russia's Khvalynskoye Line"]

[Excerpt] [passage omitted]

Today the interests of various states, including those that have been recently formed, are once again beginning to clash on the water area of the Caspian Sea. Therefore, the strategic and economic significance of the Lower Volga and the Caspian are once again dramatically increasing, making them Russia's toehold in this region. Currently, the Caspian , from an at one time "internal" sea, the shores of which still recently belonged to a total of just two countries, is being transformed into a sea with a complicated international legal regime. First of all, this has been caused by the need to delimit the territorial waters and the economic zones among the sovereign states that have been formed on its shores. And although today Russia has been left with a total of 770 km of coastline, it needs to be defended. However, there are still no borders that are precisely defined by treaties and, therefore, there is no proper order. This is the second reason. At the present time, a mass of Russian goods and minerals are exported along the Volga through Astrakhan. Even cases of the export of weapons and other military equipment have increased—there is a war going on nearby. Furthermore, due to the lessening of monitoring by Russia in the northern Caspian, fish and seals are being caught on an ever increasing scale here and, if this unlimited "fishing" continues further, the Caspian's wealth will be substantially reduced in several years. Take just sturgeon. The Russian fish hatcheries located in Astrakhan and in the oblast are exclusively involved with their restoration. It turns out that Russia is breeding valuable species of fish and the other states are catching them.

And this is far from all of the reasons why this region is increasingly acquiring the characteristics of Russia's southern coastal "outpost" on the Caspian. Add to what has been said that the process through which the Caspian region states are acquiring their sovereignty is naturally accompanied by the creation of institutes and all that is inherent to them, including armed forces with navies. Already right now the Iranian Navy contains 62 ships and the Azeri Navy has 15. Both Kazakhstan and Turkmeniya plan to have their own navies. Under these conditions, the role of the Caspian Flotilla is once again increasing for Russia. However, after the transfer of some of the flotilla's ships, bases, and infrastructure facilities to the former union republics, its forces have been significantly reduced. Furthermore, it has lost more than a third of its officer personnel: part went to Ukraine, part to Belorussia [Belarus], others have remained in Azerbaijan or have been released into the reserve. Losses of warrant officer cadres exceed half of their former strength. The state of the flotilla's surface combatants and ships also leaves a lot to be desired.

But despite everything, the flotilla exists, is developing infrastructure in new basing locations and is even expanding. In connection with this, the seamen need to resolve a mass of problems that are not characteristic to them. The redeployment has proceeded with difficulty and, first and foremost, due to the time factor. The time periods in which the Caspian Flotilla was transferred to new locations is not proceeding in any comparison with the planned time periods for the withdrawal of Russian troops from other regions. And it was vitally important to create at least the minimal conditions for its basing. However, there was practically nothing at the new locations. In the first stage, in 1992, there was a catastrophic

shortage of buildings, wharf frontage, housing and financial support. The Russian Government, recognizing the significance of defending this region, has rendered substantial support to the flotilla. Both the President and the Prime Minister have visited it. The Patriarch of Moscow and All Rus Aleksiy II also consecrated this ground.

The leadership of Astrakhan Oblast was prepared and met the seamen as it could. Only that person who knows all of the difficulties of rebasing can really assess the work done by them. The seamen's families have been mainly housed in Astrakhan itself: because it is practically impossible to build houses in very short periods of time under current conditions, they found a solution in leasing some of the dormitories from fishermen, VUZs [higher educational institutions], and other organizations. Plots of land were allocated for the flotilla. The issue on the transfer of the fishing boat repair plant to the military seamen is approaching resolution. Some ships came to Astrakhan to a not altogether empty place: one of the flotilla's battalions was already deployed there. Its base was the foundation for the further development of the needed infrastructure. But there's still a great deal of work in this direction.

In accordance with the plan, by 1995 the flotilla must become a full-fledged combined formation that is capable of accomplishing all of the missions assigned to it. At the present time, this plan is being made a reality. So, for example, last year the flotilla had already obtained a number of ships and this year several crews left for their delivery and acceptance from industry. Other, including social, problems are also being resolved. In the social aspect, the construction of a separate garrison, normal housing, outpatient clinics, and a modern hospital are planned ..

At the present time, some of the flotilla's ships are based at Zolotoy Zaton. It's supposed to be a location with a developed infrastructure but it has its own difficulties. Approach routes cause a great deal of concern. Unfortunately, for the time being they are ordinary dirt roads which can be utilized only in the dry period of the year because the first rain makes them impassable. And this is practically the link to the world: both fuel, food, spare parts and other consumable materials are delivered using them. Wastes, garbage, and spent POL [petroleum, oil, lubricants] are carried off on them. Not everything is satisfactory with the supply of electric energy and steam, especially in w nter. Sometimes we have to drive the boilers and diesel engines of surface combatants and boats because of this, thereby reducing the period of their service.

One more problem that is new for the flotilla consists of the fact that the Volga freezes during the winter and therefore some of the ships need to be transferred to more southerly areas so that they can accomplish their missions and where we also need to provide living conditions for them. In the process, icebreakers are needed and the issue of obtaining them is very urgent for the flotilla. Furthermore, some of the flotilla's forces are located at Makhachkala. The situation there, as we know, is much more complicated than in Astrakhan and its repercussions are being felt in military posts and garrisons and there is an outflow of the Russian-speaking population from there. Officers and warrant officers are justifiably concerned about the safety of their families and they don't wish to serve in that situation. There are also not only cases of threats directed at the seamen and at their family members but also cases of direct hooligan attacks. And a tragedy occurred quite recently even in Astrakhan: Senior Lieutenant Yu. Plodiyenko, who saved his comrades at the cost of his own life, died at his combat post.

Under these conditions, it is difficult for the flotilla command authorities to resolve the very complex missions that face them today because the flotilla is practically being reborn all over again. And the fact that this has become possible is due first of all to the contributions of the people who are serving here: the warrant officers, officers and admirals. Right now the hardiest have remained at it and those who were "weaker" have left it in hard times: they have either left for the other navies, they have remained at their old places or they have bid farewell to the navy. Because Captain 1st Rank S. Pashkin and Captain 2nd Rank V. Filozop, who proved himself to be a hero in the emergency situation and who has been submitted by the command authorities for the order "For Personal Bravery", Captain 3rd Rank A. Gushchin, Senior Lieutenant A. Doronin, Senior Warrant Officers V. Ovchininkov and V. Dovgopolov enjoy such high prestige in the flotilla. Seamen from other fleets are also expressing the desire to serve in the flotilla.

The flotilla command authorities are resolving the problem of cadres, that is so complicated for the entire Navy, by quite aggressively enlisting women for military service, the fraction of which is reaching 6-7 percent in some units. But then again, assessments of their service are very positive and the experience of foreign navies attests that the female social stratum in the army can total 10-12 percent without damage for combat readiness.

The gray-haired Caspian is uneasy. Strong northerly winds frequently sweep over it, bringing fierce storms with them. Covered by steep waves, the sea becomes threatening and dangerous. Unfortunately, today "storms" of another kind are blowing over the Caspian today: storms sowing disunity, destruction and, at times, even death. And since there are now several owners on the Caspian, they will have to work together to resolve problems and issues that arise among them. And it is better to do that using a friendly, peaceful method on a treaty basis.

History has completed its latest loop. The Lower Volga is once again becoming one of the regions where Russia will have to urgently solve a mass of problems. Once again, Russians will hear the words that they have

become familiar with since childhood—Volga, Astrakhan, and Caspian. Once again Russians must set up border posts there, guarding the peace, calm and great wealth of Rus. Let's hope that this time our outposts will be durably placed.

Russia is great and there is nothing more to hand over!

Russian Naval Test Range Moves From Estonia to Leningrad Oblast

94UM0391A Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 92) pp 14-17

[Article by Capt 1st Rank V. Parkhomenko, Dr. of Technical Sciences, Professor: "Test Range Leaves Estonian Republic"]

[Text] Renewal of the Russian Navy within the framework of the new military doctrine is possible only on the basis of extensive scientific research, both theoretical and experimental, to include testing of weapons, equipment and the ships themselves in the field.

Today, one of the most important qualitative characteristics of a ship is its detectability by the enemy's reconnaissance, observation and target indication equipment, and the degree of protection afforded against weapons having guidance systems reacting to ship physical fields.

As we know, the parameters of ship physical fields are measured by both maneuvering (ship) and stationary (test range) resources. Both are used in the Russian Navy (in distinction from the U.S. Navy, which uses test ranges only). Maneuvering resources are mobile, and they make it possible to take measurements in different regions of the sea; however, owing to their metrological features they are used primarily for directly checking the correspondence of the levels of ship physical fields to established norms. Stationary systems do not require special deployment for measurements, which significantly reduces testing time and provides for acquisition of broader information, and they can be used effectively in the course of scientific research.

Under today's conditions, both our test ranges and those of foreign countries carry out a large number of specific tasks, including in particular: accumulation and analysis of data on the physical fields of ships of different classes, participation in creating new monitoring, measuring and analyzing equipment, development of the procedures of measuring, checking and standardizing ship physical fields, testing and improvement of these procedures in the field, and research on ship physical fields, particularly with the goal of revealing sources of fields exceeding prescribed levels and developing recommendations on how to reduce them. Our test ranges carry out these and other jobs in this area both independently and jointly with other naval organizations, industrial enterprises and institutions of the academy of sciences. In this case, the effectiveness of the research is related to the territorial location of the test range. Proximity of scientific research institutions of the corresponding profile, together with their specialists and modern apparatus, the possibility of utilizing the production base of industrial enterprises to manufacture models of instruments and equipment, and use of ships given over to the navy for testing under comprehensive programs are factors helping to increase this effectiveness.

Nor should we forget another function of test ranges—training personnel with the needed qualifications for institutes and directorates of the navy, the Naval Academy and naval institutions of higher education.

These specific tasks were assigned in particular to a test range near Tallinn and to a research base in the Crimea. However, in September 1992 the base located in Balaklava was incorporated into the Ukrainian Navy, to a significant degree through the efforts of base commander Captain 1st Rank O. Prodan and his deputy Captain 1st Rank S. Chubarov. The base is currently undergoing reorganization, placing its further existence in doubt. The fate of the test range, which celebrated its 40th birthday on 12 September 1993, was different.

Established in 1953 in Khara-Lakht Bay, 75 km from Tallinn, the Naval Test Range No 1 was essentially the only large scientific research center studying ship physical fields in the Baltic. It may be said without exaggeration that the entire country built it. This was a unique facility. The test range possessed sonar and hydrodynamic test beds, a test bed for magnetic treatment of ships and adjustment of steering controls, a magnetic modeling laboratory, an electric field laboratory and a large number of hydraulic engineering structures. Close to 1,000 surface ships and submarines of dozens of designs passed through these facilities, 50 scientific research projects were completed, and the results were introduced into naval requirements, into manuals and regulations on ship protection, and into specifications of new equipment and apparatus.

Under the leadership of Rear Admiral Ya. Krivoruchko and captains 1st rank L. Dubinin, R. Krupnov and V. Chizhevskiy, in the 1970's the test range became a huge scientific research and testing organization having extensive ties with the USSR Academy of Sciences, the State Standards Committee and enterprises of ship building industry. During this time it significantly widened and strengthened its ties with enterprises and organizations of the Estonian SSR. Officers of the test range took a direct and active part in testing of the latest ships and submarines of the Northern and Pacific Fleets, and organized special research. The results served as the basis for developing measures to produce physical fields of ships currently afloat, ships under construction and those still on the planning boards.

The test range's associates have heard uncontested praise for developing the methods and resources of measuring ship physical fields and processing the data. In the navy

they were the [illegible] measurement and analysis. Nor [illegible] forget the test range's contribution to training [illegible] qualified specialists. More than 20 of its [illegible] have become scientists with higher degrees.

The 9 July 1980 government [illegible] on Further Reduction of the Noise of Nuclear-Powered Submarines called for modernization of the test range with the goal of developing its laboratory [illegible] further. There were plans for building new underwater test [illegible], replacing the measuring complexes and carrying out capital construction. However, cancellation of appropriations as a result of perestroyka processes made it impossible to carry out modernization by the intended deadline, and subsequent changes in the [illegible] situation, and chiefly Estonia's departure from the USSR and then the Union's disintegration, made it [illegible] and impossible to carry out the planned volume of work.

Its location within a foreign state and the uncertainty of the test range's status in light of the growing strength of nationalistically oriented circles in the Estonian Republic had a negative effect on its scientific activity and production. This is why the question of radically resolving the test range's fate with regard for planned withdrawal of the Northwestern Group of Forces and the Tallinn Naval Base to Russian Federation territory was raised in 1991.

A special commission was appointed in order to resolve the issues of its reorganization and to conduct negotiations with the Estonian side. The commission was placed under my charge. Fundamental agreement regarding the suitability of preserving the institution in Khara-Lakht Bay and using it in the interests of the RF Navy and the Estonian Navy was reached in 1992 in the course of repeated working contacts with Minister of State Rayvo Vare and other officials of the Estonian Republic. Providing scientific and technical services to Baltic states in questions of measuring and studying ship physical fields was proposed as one of the directions of its activity. Proposals for using the test range's scientific potential in the interests of space were also developed with the purpose of making it a highly competitive organization in the very near future.

Essentially, only one question raised disagreement in the prepared package of documents on implementing the reached agreement: While the Estonian side insisted on staffing the test range with civilians or manning it with servicemen of the Estonian Republic, we suggested that executive positions in the manning table (up to division chiefs inclusively) should be filled by officers of the RF Navy, with all other positions being filled by blue and white collar workers. Changing all of its associates to civilian status while filling executive positions with our specialists who would remain as personnel of the RF Navy was seen as a compromise.

Looking back, I can say with confidence that implementing the agreement reached with R. Vare would have best served the interests of the navies of the Russian Federation, Estonia, and other Baltic countries possessing naval forces, and of course the interests of RF citizens who had lived in the settlement of [illegible] since the day the test range was established. Mention should also be made of the fact that neither the command nor the associates of the test range had ever experienced cases of negative contacts with the indigenous population of Kharyuskiy Rayon in the "pre-perestroyka" period. But events were destined to develop differently.

For practical purposes, a government crisis that resulted in replacement of the Estonian cabinet of ministers scuttled the agreements, which had not been given any legal force. The new individuals who continued the negotiations on the Estonian side wished to interpret the scientific organization as nothing more than a Russian naval base threatening the sovereignty and transgressing upon the economic well-being of what they called their "tiny, impoverished Estonia." Administrative advisor Priiks was distinguished by special zealousness in destroying all that had been accomplished. And although the Estonians offered to lease us land for the test range and award it the status of a naval base, they asked for such an unrealistic rent that there was no doubt that they counted on us rejecting it. The situation regarding the test range was also aggravated by publication of Order No 126 of the Main Command of the CIS Joint Armed Forces dated 4 April 1992, which essentially prohibited all commercial activity by it. In this way, "everything is possible" transformed into "nothing is permitted." Consequently, further attempts at preserving the test range in Estonia and making a profitable enterprise out of it lost all meaning. Dozens of documents coordinated with financial, economic and legal departments and approved by the naval command, the RF Ministry of Defense and the State Committee for the Management of State Property, and contracts signed with Russian and Estonian enterprises, firms and organizations transformed into a useless pile of papers. The months I spent with Captain 2d Rank S. Sazonov, the acting chief of the test range, in Moscow and Tallinn "corridors of power" were wasted.

The fate of the test range had to be resolved quickly, and on a new legal basis. The most radical solution, one not requiring special effort, and apparently desired by a number of bureaucratic departments, was to disband it. On the backdrop of the devastation in the country and the enormous difficulties experienced by the navy, this decision might not even have appeared blasphemous. In this way, the test range found itself omitted from the list of troop units to be relocated from the Baltic, which for practical purposes predetermined its automatic disbanding. Under these conditions Vice Admiral V. Polyanskiy, the chief of the Ship Building Directorate, Rear Admiral I. Zakharov, chief of the Ministry of Defense Central Scientific Research Institute No 1, Captain 1st Rank O. Maslov and other officers had to exert a great deal of effort to substitute the word "disband" in the corresponding plans by the words "relocate the test range."

power and under tow by the icebreaker Baran [illegible] of the motor and tractor equipment needed to maintain normal life at the test range was delivered.

Because the RF Ministry of Defense did not specifically reserve resources for the relocation as a separate item, using a cost-accounting organization we made maximum use of our own internal reserves for this. Despite the fact that the recent times have been distinguished by instability in the positions of the military leadership regarding rights granted to scientific and testing organizations of the Ministry of Defense operating under self-financing conditions, we took all possible steps to ensure the test range's survival through the cold winter and spring of 1993 and to fulfill the relocation plan approved by the naval Main Command and avert the social explosions that nearly occurred on several occasions. Nor should we forget the efficient, highly professional work done by finance specialists headed by Lieutenant Colonel S. Kushnarev, who ensured timely payment for work done by the test range on the basis of contracts. We are also indebted to them to a significant degree for attaining complete mutual understanding with the higher financial body, headed by Colonel Ye. Abrashkin, which provided timely assistance in converting monetary resources.

The work experience acquired by associates of the test range in 1992-1993 in servicing its ZPD (not yet completely identified) by the watch method has allowed us to set up joint with specialists of the Central Scientific Research Institute imeni A. N. Krylov and on the basis of delivered equipment, temporary test fields with which to measure and check the physical fields of ships, ensuring a high quality scientific and technical product on time—is the main objective of the test range.

In the first stage, it is fully understandable that such relocation is unavoidably associated with fulfillment of functions by scientific associates atypical to them, functions that are significantly destructive in nature, with loss of a stable way of life and with periodic experiencing of extreme situations. Moreover, successes in scientific and productive activity depend directly on living conditions and the personal well-being of people. This is why the chairman and members of the relocation commission tried to do everything within their power to make the move and the initial period of reestablishment as painless as possible.

On 17 and 18 November 1993, which were unusually frosty days, a column of 20 vehicles carrying test range personnel and their families arrived at the new place. The last to leave the test range was Captain 1st Rank V. Bokin, as is expected of a commander. The promises of representatives of the naval command to accommodate all of the new arrivals in a sanatorium didn't materialize (we of course didn't really think they would), but to make matters worse, even tents were not to be had. Owing to the assistance of local administrative head M. S. [illegible], deputy director of the local affiliate of the Energiya Scientific-Production Association Yu. Ogurtsov, chief of the testing station of the Central Scientific

Research Institute imeni A. N. Krylov L. Khromykh and director of the tourist base of the Manula Joint-Stock Company N. Okhrimchuk, all of the new arrivals were temporarily accommodated in living quarters allowing them to get through the winter normally. In the future, fully specific measures will be implemented by Colonel S. Trubitsyn, deputy commander of the Leningrad Naval Base, at the direction of the naval commander-in-chief to provide some housing support to the test range's associates. And we are seeking possibilities for radically solving the housing problem, doing everything necessary for this.

The relocation has been completed. A period of creative activity aimed at restoring the test range on its new territory, and a scientific and technical base that will be used jointly for the moment with the Central Scientific Research Institute imeni A. N. Krylov, is beginning. Study of the problems of planning an experimental model of the test range will reach its conclusion in 1994. The initial appropriations for 1994-1996 have been planned by a decree of the Council of Ministers. The naval commander-in-chief approved a plan of measures for 1994 and subsequent years to set up and develop its infrastructure. There are full grounds for believing that this plan will be carried out.

And so, the test range has left the Estonian Republic, basically preserving its equipment, personnel, and the 40 years' traditions and number of the military unit intact. The losses suffered by the RF Navy in this case are tangible. Given today's requirements on improving the qualitative characteristics of ships and raising their combat effectiveness, the importance of research on ship physical fields is growing. Consequently, there is no doubt that the test range will be restored in full volume in the next few years, and in a new place and on a new scientific and technical basis at that. Russia has sufficient forces and resources for this. The Estonian Republic lost incomparably more: A scientific research center doing work in which all Baltic countries are interested will apparently no longer exist in the foreseeable future on the shore of Khara-Lakht Bay.

Official Department

A Decision Has Been Made—A Special Sarcophagus Will Cover the Nuclear Submarine 'Komsomolets'

94UM0389C Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) p 36

[Unattributed article: "A Decision Has Been Made—A Special Sarcophagus Will Cover the Nuclear Submarine 'Komsomolets'"]

[Text] The Committee for the Conduct of Special Work (KOPRON) under the Russian Federation Government has totally completed the study of materials associated with the investigation of the nuclear submarine "Komsomolets" that was lost in the Norwegian Sea on 7 April 1989. The research that was conducted this year has shown insignificant seepage of cesium and strontium radioactive isotopes from the nuclear submarine, which attests to a seal failure of the reactor and partial destruction of the pressure hull. However, the latest measurements have shown that, although the nuclear reactor is giving off a definite background, it does not pose a serious danger. We have detected evidence of corrosion and fragments of the torpedoes' warheads in the submarine's torpedo tubes. The warheads, which are gradually being destroyed, contain plutonium and, according to the assessments of KOPRON Chairman Captain 1st Rank T. Borisov, could result in serious ecological consequences in 2-3 years. KOPRON's experts have arrived at a final conclusion: It is dangerous to salvage the "Komsomolets" and therefore it is necessary to build a special sarcophagus from the submarine's hull, having sealed the submarine's nose section and torpedo tubes using a special compound (development of the compound is continuing). The Russian Academy of Sciences, Gosatomnadzor [State Committee for Nuclear Energy Oversight], Minatom [Ministry of Atomic Energy], environmental protection organs and the Ministry of Defense have supported the proposals of T. Borisov's committee.

To Naval School Entrants

94UM0389D Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 37-38

[Unattributed article: "To Naval School Entrants"]

[Text] If you have decided to tie your fate to the sea, this is possible! To do that, you need to enter one of the higher naval schools. If you have not yet been promoted to the 9th grade, you can become a student of Nakhimov School where young men from 15-16 years of age are accepted (you must reach your 15th birthday during the year of matriculation), have state of health that is suitable for study at military schools and desire to become a Naval officer in the future. The mandatory condition—is study at an English language school.

Parents or individuals who substitute for them submit requests for acceptance to **Nakhimov School** by 1 July. The documents required to do that are completed through rayon military commissariats (city military commissariats) at the place of residence. Among them are:

the entrant's personnel request addressed to the head of the school;

the parents' request which states that their son will continue to study at a naval school after graduation from Nakhimov School;

an original certificate of birth;

a medical examination by a military medical board under the rayon military commissariat (city military commissariat) at the place of residence;

and, a progress report card for the first three study quarters (the candidate submits the original education certificate upon arrival at the school), which must mandatorily indicate which foreign language was studied;

a school reference;

information from the parents' work location or the residence location on the composition of the family and, in the case of the absence of either of the parents or of a divorce—a copy of the death or divorce certificate.

Those persons permitted to take the entrance examinations receive a summons that gives them the right to request travel documents at the rayon military commissariat to the place of residence.

Upon arrival at the school, young men undergo a medical examination, a physical fitness test, and take competitive entrance examinations on the Russian language (dictation) and mathematics (oral).

The term of study at Nakhimov School when matriculating after the 8th grade is three years. Upon completion of the school, graduates (without examinations) are sent to higher naval schools for further study.

The school's address: House 2/4, Petrogradskiy Naberezhnaya, P-46, St. Petersburg, 197046.

Russian Federation male citizens who have a middle education are being accepted at **higher naval schools**:

from among civilian youth who are 17-21 years of age;

compulsory service military personnel and those soldiers who have been released into the reserve who are under 23 years of age; and,

army and navy warrant officers upon expiration of two years of service in the positions of army and navy warrant officers and officers, and also compulsory service military personnel who are up to 24 years of age.

Servicemen who desire to enter schools submit requests addressed to the unit commander prior to 1 April.

Individuals from among civilian youth submit applications (requests) prior to 1 May to the rayon (city) military commissariat at their place of residence, addressed directly to the chief of the selected school. The following is attached to the request:

three certified 4 x 6 cm photographs (without headgear);

an autobiography;

a reference from the place of work, study or service;

a copy of the middle education document (middle school students submit information on their progress at this period of time).

The graduate personally submits a passport, birth certificate, military service card (or residence permit) and an original middle education certificate to the acceptance board.

A special medical examination of candidates is conducted beforehand at military commissariats. Military draft boards carry out their selection to naval schools from among civilian youth prior to 25 May.

Matriculation of candidates who meet acceptance conditions is conducted based upon the entrance examinations. As a rule, this is Russian language and literature (written), mathematics (written), and physics (oral or written).

Servicemen and young men from among civilian youth, who have been awarded a gold or silver medal upon graduation from middle school or who have received diplomas with distinction upon graduation from middle special educational institutions or middle professional-technical school, take one examination on the profiled discipline. Upon receipt of a grade of "outstanding", they are released from having to take further examinations and, upon receiving a grade of "good" or "satisfactory", they take examinations on the remaining disciplines.

The term of study at higher naval schools is five years. Cadets are under full state support. They are annually provided two-week winter holidays and also a month-long summer leave. During the period of leave, they are provided with free transportation to the location where the leave is spent.

All cadets who have passed state examinations and who have defended their graduation thesis (project) are awarded the military rank of "lieutenant" and are handed a higher education diploma and the prescribed badge.

Having received a lieutenant's ceremonial dagger and shoulder boards, you will become a part of the glorious Naval officers corps. Modern equipment, surface combatants and submarines, and naval aviation aircraft will be under your control! Everything is in your hands.

Addresses of Naval Schools:

Higher Naval Orders of Lenin and Ushakov, Red Banner School imeni M.V. Frunze (trains navigators, surface combatant antisubmarine warfare weapons, acoustics, surface combatant mine and torpedo weapons, and hydrometeorology specialists) V-162, St. Petersburg, 199162;

Higher Naval School of Submarine Navigation imeni Lenin Komsomol (trains navigators, missileers, submarine antisubmarine warfare missile and torpedo weapons specialists) L-93, St. Petersburg, 198093;

Higher Naval Order of Lenin School imeni F.E. Dzerzhinskiy (trains electrical engineers, shipbuilding engineers, electrical systems engineers) F-195, St. Petersburg, 190195;

Higher Naval Engineering School imeni V.I. Lenin (trains mechanical engineers and chemical engineers) 4, St. Petersburg - Pushkin, 188620;

Higher Naval School of Radioelectronics imeni A.S. Popov (trains radiotechnical service engineers, and automated systems and software engineers) 4, Petrodvorets, St. Petersburg, 198135;

Kaliningrad Higher Naval School (trains radio communications engineers, artillerymen, and missileers), Oblast, Kaliningrad, 236026;

Pacific Ocean Higher Naval School imeni S.O. Makarov trains navigators, torpedomen, communicators, radiotechnical service engineers, electronic equipment and aircraft weapons engineers, and missileers), Vladivostok-6, 690006.

Many young men ask the following question: how do I become a **naval infantryman**? We offer the addresses of several schools, after completion of which graduates are sent for service in these troops:

Far East Higher Combined Arms Command School imeni K.K. Rokossovskiy; Blagoveshchensk-21, Amur Oblast, 675021;

Blagoveshchensk Higher Tank Command School imeni K.A. Meretskov; Blagoveshchensk-18, Amur Oblast, 675018;

Lomonosov Naval College trains radiotechnical specialists, ship operator technicians, ship mechanic technicians, and electromechanical technicians for sailing on Naval auxiliary ships. Its address: House 18/46, Ulitsa Krasnogo Flota, Lomonosov, Leningrad Oblast, 189510.

Edict Announces General Officer Promotions

94UM0391B Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) p 18

[Text] From the edict of the President of the Russian Federation "On Awarding Higher Officer Ranks to Servicemen of the Armed Forces of the Russian Federation"

The following ranks shall be awarded:

Vice Admiral

GRISHANOV, Vladimir Vasilyevich

Rear Admiral

BLIZNYUK, Sergey Anatolyevich LYAKIN, Viktor Fedorovich SERBE, Yevgeniy Yakovlevich SHCHEGOLEV, Vyacheslav Mikhaylovich

Major General

KARPOV, Vladimir Vitalyevich

[Signed] President of the Russian Federation B. Yeltsin
Moscow, the Kremlin
31 December 1993

Russian, Kuwaiti Navies Conduct Joint Exercises

94UM0391C Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) p 18

[Article: "First Russo-Kuwaiti Exercises"]

[Text] A joint exercise of warships of Russia and Kuwait was held in the period from 25 to 29 December 1993 in accordance with an agreement between these states. Participants from the Russian Navy included the large ASW ship "Admiral Vinogradov," the large assault-landing ship "N. Vilkov" and the tanker "V. Kolechitskiy"; participants from the Kuwaiti Navy included the missile boat "Istiqlal," eight coastal defense launches and two F-18 airplanes.

The exercise plan foresaw joint maneuvering of ships, communication training, search and rescue of disaster victims, detention and examination of a vessel, artillery firing on water-surface and airborne targets, and joint conditional strikes against an enemy assault landing detachment undergoing sealift.

On 28 December the progress of the exercise was kept under observation by Major General A. Al-Mumin [transliteration], chief of staff of the Kuwaiti Armed Forces, who gave a high assessment to the combat proficiency of the crews of our ships.

On 30 December, summarizing the results of the exercise aboard the large ASW ship "Admiral Vinogradov," Admiral F. Gromov, commander-in-chief of the Russian Navy, noted that Kuwaiti and Russian seamen, who successfully completed all of their missions, are honorably continuing the traditions of naval cooperation between our countries, established long ago by the legendary cruiser "Varyag," which entered the port of Al-Kuwait in 1901 to open a Russian consulate there.

Kuwaiti Navy acting commander Lieutenant Colonel M. Yakut expressed deep satisfaction in the high organization and results of the first joint exercises of the two countries which, he emphasized, were a good school for Kuwaiti seamen.

Captain 1st Rank A. Yakovlev, who directed the exercise, read the names of servicemen who distinguished themselves in the course of the combat exercises. On the Russian side these were Captain 1st Rank V. Chernyavskiy, commander of the large ASW ship "Admiral Vinogradov"; A. Denisov, captain of the tanker "V. Kolechitskiy"; Captain 1st Rank V. Andreyev and Captain 3d Rank A. Demin, officers of the operational staff; the crew of the helicopter under the command of Lieutenant Colonel T. Guzoirov; Captain-Lieutenant V. Kanev, department commander; the examining team headed by Captain A. Kozlovskiy; Petty Officer 1st Class A. Sorokin, commander of a signal detachment. On the Kuwait side these were primarily the crew of the missile boat "Istiqlal" and its commander, Major Mansur.

After a short rest in Al-Kuwait, where our seamen celebrated the New Year, the detachment of ships of the

Russian Navy returned to sea to participate in Gulfex-22 joint exercises with ships of the American, English and French navies held in the Persian Gulf.

1993 Naval Combat Training Championship Results Announced

94UM0391D Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) p 19

[Article: "Results of Naval Championships Summarized"]

[Text] An order published by naval commander-in-chief F. N. Gromov announced the results of the 1993 naval championships in different forms of combat training. The best results were attained by formations, ships and units of the Northern and Black Sea fleets, which had won the largest number of naval prizes, as is evidenced by the following data (in comparison with 1992):

	1992	1993
Northern Fleet	7	10
Pacific Fleet	6	1
Baltic Fleet	2	2
Black Sea Fleet	4	6

The crews of nuclear-powered submarines under the command of captains 1st rank S. Safronov and A. Yefanov and Captain 2d Rank V. Kvasov in the Northern Fleet, and under the command of Captain 1st Rank A. Mishin in the Pacific Fleet, attained high indicators in missile, mine and torpedo tactics. At the same time the greatest successes were attained by the crew of a Black Sea Fleet diesel-powered submarine under the command of Captain 2d Rank K. Vasiltsev, which won two prizes.

In missile training, the best were the TARKR "Admiral Nakhimov," Captain 1st Rank A. Galanin, commander; a formation under the command of Captain 1st Rank Yu. Kostyrko consisting of two tactical groups of small missile ships and missile boats of the Black Sea Fleet; a coastal missile unit of the Black Sea Fleet under the command of Lieutenant Colonel O. Gogeyzel; an aviation subunit of the Northern Fleet, Lieutenant Colonel A. Anokhin, commander. The prize for best artillery training was awarded to a Northern Fleet task force under the command of Captain 1st Rank S. Shmakov; the prize for best fire training was received by Major V. Novikov's Black Sea Fleet marine infantry unit. Regarding organization of antisubmarine warfare, the commander-in-chief singled out the Northern Fleet formation under the command of Rear Admiral G. Revin; a unit of small ASW ships of the Black Sea Fleet under the command of Captain 3d Rank A. Permyakov; a Northern Fleet aviation subunit under the command of Lieutenant Colonel S. Dergunov.

Besides this, the naval commander-in-chief also awarded prizes to several formations, ships and units.

Questions of Theory

Treaty Limits Needed on ASW Activity

94UM0391E Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) pp 33-36

[Article by Capt 1st Rank (Ret) B. Makeyev: "Limiting Antisubmarine Activity as a Factor of Strategic Stability"]

[Text] Limiting antisubmarine activity may be viewed as an important part of the overall problem of finding ways to reduce military activity in the world ocean. The end of the Cold War, elimination of former conflicts between the East and the West, and a number of other new factors bringing on positive shifts in international relations are making inclusion of the naval "component" in negotiation processes even more important.

There is no doubt that arms reduction and reinforcement of mutual trust in military affairs must be comprehensive, embracing all of their forms. In this aspect navies possessing enormous firepower, mobility, independence, and a significant ability to resist the enemy can in no way be an exception, all the more so because in the last few decades they have become an important means of offensive military activities, including against objectives on land. If we ignore this, a shift of the arms race to the sea would not be excluded. Not only might this be an obstacle to lowering the overall military balance to the level of defensive sufficiency desired by all, but it may also act as a powerful destabilizing factor in this process. In this case although unilateral steps to reduce the composition of the fleets doubtlessly do limit the arms race at sea to a certain degree, they cannot produce a decrease in the overall military balance, and, consequently, strategic stability in the world. If the state of the fleets is disregarded, such reductions will actually be unsupervisable, and they will doubtlessly be accompanied by a desire to improve naval forces qualitatively and to raise their combat effectiveness. This is why the inclusion of sea armament in the negotiation process together with other forms of armament is an objective reality.

Considering the differences in the approaches to this problem in different countries, it would appear suitable to approach its solution gradually, in stages. In this aspect I can propose three stages of its resolution. First—creating and strengthening measures of trust at sea, upon which both collective and unilateral actions of the agreeing parties need to be oriented. Their goal is to reduce the danger of military confrontation and tension, and to avert conflicts resulting from misinterpretation of one another's actions. While these are not measures of real disarmament per se, and while they do not have an effect on either the structure or the effective combat

strength of the fleets, they will nonetheless create a climate of trust between states, and promote reinforcement of international peace and security. These measures should include agreements on preventing incidents at sea, on the creation of a system of notification regarding major exercises and maneuvers, on launchings of ICBMs and SLBMs, and on the concentration and relocation of naval forces, and other measures that may significantly reduce the probability of chance conflicts at sea.

In the second stage we need to reach agreement on measures to limit especially dangerous naval activities, and to reduce the possibility of creating conditions for a surprise attack from the sea and for initiation of offensive actions there of a major scale. Prohibiting or limiting activities of naval forces in the patrol zones of missile submarines, and later on in regions where the greatest concentration of naval forces is observed today, as well as in international shipping lanes, in fishing zones and so on, should be included among such measures. In the third and final stage we could raise the issue of balanced reduction of the composition of fleet forces, with regard for the effectiveness with which they can carry out offensive missions in agreed regions.

Today, productive negotiations are being conducted only within the framework of the first stage, as outlined above. As for the second, I feel that it should begin with talks on limiting antisubmarine activity.

It should be clarified here that antisubmarine activity is a multifaceted concept. It penetrates into all aspects of naval functions, and it is represented by an entire complex of measures directed at detecting and destroying enemy submarines with the purpose of preventing strikes by their missiles and torpedoes against ships (vessels) and coastal objectives, and at preventing them from carrying out reconnaissance, laying mines, and carrying out other tasks. As we know, antisubmarine warfare is accomplished by special antisubmarine forces and resources.

In this case, ship and aviation antisubmarine warfare [ASW] forces rely upon extensive networks of permanently stationed sonar systems, on space and air reconnaissance, and on command, control and communication resources, which in their integration make up a global system for monitoring the underwater situation in vast regions of the world ocean.

Naturally, it would be hard to accept disturbance of any links of this system, which ensures the safety of naval forces and allows them to carry out their missions at sea effectively. This is the principal argument offered by the American side whenever the discussion turns to limiting antisubmarine activity. However, there are links in this system, after all, that can and must be viewed as objects in relation to which the second stage of negotiations on reducing military activity at sea should begin. I am referring to limiting antisubmarine activity not in general, but only in regions of possible covert patrolling by strategic submarine forces, which, together with other strategic nuclear forces, are deterrent forces that provide strategic stability and maintain a potential readiness for a retaliatory nuclear strike against an aggressor.

It is fully understandable that the capability of these forces for carrying out this mission depends not only and not so much on parity of nuclear resources, regarding which the corresponding agreements already exist, but also on their ability to resist the enemy in the event of enemy actions. After all, in a crisis one of the sides might use its ASW forces for preemptive strikes against the other side's SSBNs in order to achieve strategic superiority both for the purpose of military and political pressure and in order to weaken a retaliatory strike as much as possible.

It is precisely in order to exclude such a situation and to increase survival of SSBNs, and ultimately to reinforce strategic stability, that it appears suitable to prohibit search operations in regions of possible combat patrols. In this case I am not asking the sides to reveal the specific areas of combat patrols by SSBNs: Keeping such areas secret is absolutely natural, and disclosing them is even unsuitable from the standpoint of raising their ability to resist the enemy in the event that one of the sides violates agreements. What I am asking for is to determine particular zones in the seas and oceans where such regions may be located, and into which access by ASW forces should be limited.

However, when we work out such measures of prohibition we need to study a number of questions, the absence of answers to which made such an initiative on the part of the USSR futile in the past. Are such restrictions on antisubmarine activities possible in the operational, technical, and legal aspects? Won't they be detrimental to other antisubmarine missions carried out by fleet forces? And finally, can compliance with such restrictions be supervised?

It seems to me that negotiations on this subject are possible and suitable because they significantly fill in the omissions in strategic arms reduction treaties. On the other, hand agreements reached in this case would not preclude other antisubmarine activities associated with defending warship formations, transporters, assault landing detachments at sea, naval bases, and so on. After all, the specific (unique) features of actions to seek and destroy SSBNs in their patrol regions make it possible to quickly distinguish them from other antisubmarine activities, and, consequently, effective supervision over compliance with agreements is possible.

In fact, in contrast to other missions of antisubmarine defense, struggle with naval strategic nuclear weapon carriers requires early deployment of forces for finding them and for keeping them under observation in order to prevent a surprise nuclear missile strike from the sea. Today, the possibility for destroying missile submarines at the onset of war before they launch their missiles has vitally important significance to both of the warring sides. All subsequent actions at sea following a missile launch,

including actions against nuclear-powered submarines, would not be able to prevent or even reduce the damage suffered by the side that had lost the initiative and allowed the enemy to purposefully employ his fighting potential, no matter how effective these subsequent actions might be. On the other hand, effective and timely strikes against missile submarines are possible only when maneuvering naval forces (aviation, surface ships, and submarines) interact efficiently with reconnaissance forces (sonar, space, air, marine radiotechnical etc.). This is why the actions of maneuvering ASW forces are the subject of negotiations to limit antisubmarine activities in regions of possible patrolling by SSBNs, and why deployment of such forces in these regions would be limited.

In this case, there is no need for detailed examination of the actions of these forces. Within the scope of the content and the orientation of this article it will be sufficient to dwell on the basic means of using ASW forces to reveal hostile intentions against SSBNs, and, thus, illustrate the possibilities of supervising compliance with an agreement. A detailed examination of the specific issues regarding search operations in regions of possible patrolling by SSBNs is a matter for experts at negotiations. On our part, we will limit ourselves to the most general forms and means of their actions only for the purposes of illustration.

Shore-based patrol aviation occupies the most important place today in search operations against missile submarines. It possesses high mobility and maneuverability, a large radius of operations, a significant search potential, including by means of the latest nontraditional detection resources, and it is less dependent on weather conditions than ship-based ASW airplanes and helicopters. Therefore, presence of shore-based airplanes in the combat patrol regions of SSBNs is subject to strict regulation. In addition, their activity depends on the surface area of the region to be searched and on the particular search resources employed in this case, and, consequently, it is rather specific, and it cannot be lumped together with actions by ASW airplanes carrying out other ASW missions.

Surface ships, which remain the principal antisubmarine defense forces of carrier formations, convoys, and assault landing detachments, can also be tasked to fight SSBNs. Sonar stations equipped with low-frequency towed antennas of considerable length, possessing a range of submarine detection that is an order of magnitude greater than the operating range of stations with onboard antennas, are now the preferred resource for seeking SSBNs. In this case the nature of maneuver of both lone ships and ship groups, including ones employing ASW helicopters, and their appearance in stipulated regions for a period of time greater than that needed for antisubmarine support to the passage of ship detachments or formations, provide the grounds for concluding such actions to be a violation of agreements reached regarding the given region.

ASW submarines are one of the most effective and covert resources for finding and destroying SSBNs in their regions of maneuver. The modern polyfunctional sonar complexes they use, which operate predominantly in passive modes in combination with high-speed automated target classification and indication systems, make such submarines the most dangerous enemy to SSBNs, and a resource that is hardest of all to reveal in such a region. But even their actions are distinguished by certain specific features in this case, associated with the need for lengthy shadowing of a detected submarine, for classifying it as an SSBN, and so on. In addition, there are certain means of monitoring their presence in a given region, implemented both by the SSBN itself and by other naval forces supporting such monitoring, which carry out such tasks with the needed periodicity in different regions determined by agreement so as not to reveal the specific patrol zone of the missile submarine.

In general, shadowing of a submarine by any maneuvering ASW forces differs from observation and reconnaissance in the given region in that they must maintain prolonged contact with the submarine, with their weapons ready for immediate use. And, although the means of such shadowing will vary (covert and overt, continuous and discrete, by lone objects and their groups, by homogeneous and heterogeneous forces), the specific tactics and the nature of maneuver immediately reveal their essence. They could of course be concealed by other actions of ASW forces in contiguous zones and regions, but concentration itself of these forces in a given zone is a major factor disclosing the true intentions. Thus, these and a number of other specific features of the activity of antisubmarine forces searching for missiles submarines (the order of transfer of contact from certain forces to others, the particular features of radio exchange, build-up of these forces in a time of danger, an so on), which we will not discuss here, make it possible not to require, at negotiations, the total absence of ASW forces from the indicated regions, which is not to the liking of the American side today. The goal of an agreement must be their quantitative restriction to a certain pre-established level. A certain permissible probability of their detection of SSBNs in the corresponding region may be used as a criterion of this level.

This approach does, of course, require complex justifications accounting for the dimensions and the hydrometeorological characteristics of the region, as well as the performance characteristics and means of use of ASW forces. While this approach should be based on state-of-the-art computerized procedures, a simple procedure based on an algorithm characterizing the probability of detection of a submarine in a given region may be used for tentative and approximate assessment of the maximum permissible strength of antisubmarine forces in a certain region.

$$P_{det} = 1 - e^{-\frac{2d_{det}V_{p}nt}{S}} \qquad (1)$$

where d_{det}—range of the detection equipment of the ASW forces; V_{p}—relative speed of ASW forces searching

for a missile submarine on patrol; n—number of units of searching forces; t—time allocated to surveying the region; S—area of surveyed region.

By some simple manipulations we get:

$$n = \frac{S}{d_{det} V_p t} \times \ln \frac{1}{\sqrt{1 - P_{det}}} \qquad (2)$$

Given certain assumptions, we can use this formula to approximately determine the nature of the ASW forces (homogeneous or heterogeneous) to be used in searching for SSBNs in prescribed regions with a prescribed P_{det}, and, consequently, introduce quantitative restrictions on antisubmarine activity in regions in which naval strategic forces may operate with the purpose of ensuring their ability to resist the enemy. The calculation procedure might be as follows in this case:

1. Determine the boundaries and total areas of prohibited regions:

   $$(S_1, S_2, S_3, \ldots S_k);$$

2. Determine the average ranges of detection resources (d_{det}), the searching speeds (V_{ASW}) and the time of operation of different ASW forces in each subregion (t), in relation to specific hydrological and hydrometeorological conditions of the region, and calculate relative speeds V_p with regard for the patrolling speeds of the SSBNs;

3. Calculate the search potentials of ASW forces that may operate in the given region: aviation—SP_{av}, surface ships—SP_{ss}, submarines—SP_{sub}, using the known approximate formula $SP_i = D_{deti} V_{pi}$. After this, determine the overall search potential of ASW forces (SP_{total}) as the sum of the potential of all participating forces;

4. Determine the areas of the zones of operation of different branches of ASW forces (aviation—S_{av}, surface ships—S_{ss}, and submarines—S_{sub}) in proportion to the search potentials using the known formula

   $$S_i = S(SP_i/SP_{det}).$$

   We assume with accuracy sufficient for tentative assessment that ASW forces will interact only within the zones of their operation in the search area;

5. Use formula (2) to calculate the number of units of different ASW forces which may not be exceeded in the given region. Because of difficulties in monitoring ASW submarines stationed in the region, when the calculated quantity of other ASW forces is present in the region, detection of just one submarine there would have to be treated as the limit. Moreover, vessels intended for long-range sonar reconnaissance would be categorically prohibited from entering the region.

The listed features of the operations and quantitative composition of ASW forces searching for SSBNs in a particular region cannot go undetected. Therefore, the appearance of unidentified submarines and of a certain number of ASW ships and shore-based airplanes in this region, carrying out some or all of the actions serving as indicators of SSBN search operations, is sufficient grounds for the conclusion that the corresponding side is violating agreements.

In conclusion, it should be noted that limiting antisubmarine operations, carried out by strategic deterrent forces, is legal from the standpoint of international law, inasmuch as it raises strategic stability at sea, it yields to control, and it does not undermine the principles of antisubmarine defense provided in all other spheres of naval activity. Reaching agreement on this issue would be a substantial step on the road to also limiting other forms of military activity in maritime regions in support of the mutual state interests of the agreeing countries, and, ultimately, it may open the road to the beginning of productive negotiations on disarmament at sea. On the other hand, stubborn rejection of this approach would be an indication of a certain lack of interest in successfully resolving this issue, which would then require implementation of other adequate measures.

Cruises and Flights

In a Checkmate Situation

94UM0389E Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 42-44

[Article by Captain 1st Rank A. Pilipchuk: "In a Checkmate Situation"]

[Text] We have grounds to call this news from the Northern Fleet very unpleasant: They have decided to prepare the Aircraft-Carrying Cruiser "Kiev" to be cut up for scrap. Ship repairmen have not managed to breathe new life into this first-born of the series of aircraft-carrying ships that are capable of receiving vertical take-off and landing aircraft on board and which was delivered to the plant quay for repair several years ago. The press of the economic crises has disrupted these plans.

Ships are built not for centuries but each of them has its own measured off time period. For example, American Iowa Class Battleships were destined to serve for approximately 50 years and many U.S. Navy aircraft carriers—for 30 years. The "Kiev's" fate was allotted a total of two decades and its younger brothers "Minsk" and "Novorossiysk"—even less. They left for the ship cemetery long before the calculated time period, without experiencing the rejuvenating impact of capital repair and modernization that extend the lives of combat ships by many years. Having found colossal resources for the construction of an aircraft-carrying "squadron", the state found itself incapable of maintaining it. The state

itself collapsed and the priority program for the development of surface combatants that are capable of unfurling the air "umbrella" of cover over the fleets forces at sea was buried under its fragments.

Right now it is already clear that the Russian Navy faces decades of intense labor for its rebirth. And not only in the context of the construction of aircraft-carrying ships. Speaking about them, we must note the obvious paradox that is so characteristic for us: Russia—a pioneer of the utilization of aircraft from the decks of ships—does not have its own aircraft-carrying fleet. During the course of the latest polemics on this issue, which have died down for well-known reasons, the sensation frequently arose that currently some people in our country do not at all want to see Russia as a powerful maritime power that is not moving in the wake of the policy of the Western "flagships", but that is affecting the course and the progress of the entire world "armada".

God be with them, with the clever writers, who want to convince us that, if we don't build one cruiser, we will be able to erect an entire housing microrayon. It is insulting only that they are being allowed to confuse unsophisticated people as if such simple "arithmetic" solutions exist in the economy. We would like to believe that common sense and a truly scientific approach to these problems reign and our Navy's service record, on which is listed over 300 years of irreproachable service to the Fatherland, will continue with honor and glory. But today, when military shipyards are nearly empty, it is important to preserve if only the naval cadres among which the state of naval aviators causes special alarm and for whom an airfield is the deck of a ship. And there are substantial grounds for alarm here.

Soon two years will have passed since the time of the serious flying accident in the Northern Fleet Air Force shipborne antisubmarine warfare regiment. While accomplishing a flying mission, a Ka-27ps (search and rescue) helicopter crashed into the Barents Sea and sank. The tragedy took the lives of seven aviators. What is the need to return to the events of the winter before last, and events so tragic at that? The entire matter is in those conclusions which the official commission, that investigated the causes of the accident, came to at that time and the "independent panel of experts" that was conducted by the helicopter crewmen themselves—the fellow servicemen of the dead comrades. Both the one and the other cited the prolonged gaps in flights from the decks of ships as one of the causes of the accident. It resulted in an error in flying technique, in shortcomings in air traffic control and, ultimately, in a great misfortune.

New Regimental Commander Colonel Gennadiy Stepanov, who was appointed after this accident, while describing the situation that had developed in the unit in 1993, noted that not a single pilot, including he himself, a pilot-expert marksman, had a certification to land on a deck at that time. Yes and how can you obtain it or confirm it if some of his regimental colleagues had not taken off into the air a single time since the beginning of the year. The fuel that was allotted for flights was enough only for several officers who had just completed school "to take to the sky" and to permit seven instructor pilots to "fly a bit". In 1993, the combat training flying period actually went to restore flying technique in the airfield area and on a route over the sea.

By the way, the regiment has been designated for joint basing with aircraft on Northern Fleet aircraft-carrying cruisers. We discussed the fate of the "Kiev" above but its counterpart "Admiral of the Fleet of the Soviet Union Gorshkov" has already been moored to the plant quay of the naval plant in Murmansk for several years. The ship repair facility of Russia's largest fleet—the Northern Fleet—is breathing asthmatically from the shortage of financial resources (even the government has been compelled to review the issues of financing the Northern Fleet) and from the loss of many suppliers who were left behind the new borders. Ships are leaving the combat formation and not are being "restored to health" at the plant quays which could still have acquired a second breath for many years. And along with them, the deck is leaving from under the feet of the carrier-based aviators, the "squaring" of which is being reduced with each written off ship.

That is how it already occurred in the Pacific Fleet from the complement of which both aircraft-carrying cruisers—the "Minsk" and "Novorossiysk"—, that were designed for VVP [vertical takeoff and landing] "Yak's", were withdrawn one after the other. I visited that fleet not too long ago as part of a group of admirals and officers of the Naval Main Staff headed by First Deputy Commander-in-Chief Admiral Igor Kasatonov. During the flight from Vladivostok to Sovgavan [Sovetskaya Gavan], a view of the dead skeleton of the "Novorossiysk" opened in one of the bays under the aircraft's wing. I had the opportunity to put to sea in this, at that time full of force, ship and my heart sank at the sight of the enormous "lifeless" ship.

At one time, we discussed at great length the imperfections of the Yakovlev firm's vertical take-off and landing aircraft that are based on aircraft-carrying cruisers. But today we essentially have a new "vertical take-off aircraft" that largely exceeds its foreign equivalents but only one floating airfield has remained for them and that one is in repair. Like some kind of hostile arm, someone's evil genie is always throwing us decades back in the construction of a modern navy, attempting to leave our gigantic maritime borders, as we shamefully say right now, "transparent" and actually—defenseless.

If the Pacific Fleet's naval ground attack aviation has already been deprived of a deck, then shipborne antisubmarine warfare aviation is waiting its turn. The number of ships on which antisubmarine warfare and rescue helicopters can be based is steadily declining and they infrequently put to sea. In 1993, the number of times they put to sea was reduced practically by a factor of two in the fleet due to the shortage of POL [petroleum, oils and lubricants] (yes and those of low quality) and spare

parts for repair. And many of them have been serving for nearly 20 years and need the renewal of existing technical resources. Incidentally, the fleet's air fleet is in the same condition where very many of them need repair or are subject to being written off. And therefore the situation with flying-tactical training remains extremely complicated. And here primarily the instructor staff takes off into the sky to maintain its skills.

Surprisingly, in the process fleet aviators have managed to primarily accomplish the missions with which they have been tasked. For example, the antisubmarine warfare crews have detected an entire series of foreign submarines which are constantly roaming off our shores. Yes, people are literally working miracles. But for how long will they suffice? In 1993, more than 1,500 Pacific Fleet seamen, including hundreds of aviators, submitted requests to be released into the reserve and nearly half of them were approved. If this is the path for the reduction of our Armed Forces, then we are successfully following it.

Mentally shifting from East to West, we see a similar picture in the Baltic Fleet that has also been exacerbated by the losses of part of the bases in the Baltic Region. Indeed, Baltic Fleet Air Force Commander Lieutenant-General Vasiliy Proskurnin is not inclined to dramatize the situation and along with his staff is doing everything so that ship-based helicopter crews maintain their skills as much as possible, even at the cost of their rehearsal at land-based airfields. Not everyone, and first of all the commander himself, understands that it is impossible to maintain an adequate level of training without a ship's deck. Already during the time of service in the Polar region, he nurtured the idea of equipping each fleet with floating pontoons, including towed pontoons, to rehearse helicopter crew take-offs and landings. This proposal appeared in the press in 1993. And a firm in St. Petersburg immediately announced that it was prepared to patent this idea which will not become expensive during its embodiment but the need for something like it is high today.

When this theme ripened in my journalistic note pad, I visited the Russian Naval Aviation commander's directorate and met with Major-General Anatoliy Likhomirov and Colonel Boris Ruchkin. They confirmed the entire complexity and urgency of the problems that have accumulated in naval aviation. Today Naval carrier-based ground attack and fighter aviation aviators have found themselves simply in a checkmate situation. Already several years ago training of carrier-based fighter-ground attack aviation pilots was occurring at the "NITKA" training complex in the Crimea in parallel with the construction of the heavy aircraft-carrying cruisers "Admiral of the Fleet of the Soviet Union Kuznetsov" and "Ulyanovsk" (the heavy nuclear aircraft-carrying cruiser that has been cut up for scrap at the slipways of Nikolayev Shipbuilding Plant and "Varyag" (the fate of this uncompleted heavy aircraft-carrying cruiser has still not been resolved). It is currently located on the territory of a neighboring sovereign state. This "NITKA" training complex permitted us to rehearse elements of a take-off from a ski jump and glide slope descents and landings while catching the aircraft tail hook on an arresting cable on a deck mock-up. The firm OKB [Experimental Design Bureau] imeni P.O Su' hoy maintained a contract with the Ukrainian side for a certain period of time on the training of several pilots of the lead group for the heavy aircraft-carrying cruiser "Kuznetsov". But Russia needs a more serious—on the governmental level—contract with Ukraine for the mass training of pilots. For the time being, the heavy aircraft-carrying cruiser "Kuznetsov's" enormous take-off and landing deck is empty. During a two-month cruise, only one aircraft landed on the deck.

It's clear that Russia must have its own training complex or center to train and retrain naval fighter-ground attack aviation pilots. The Navy's aviation command authorities went to the government with a petition to grant a location and resources for its construction in Russia. But it seems that right now they are busy with other things and it is hard to predict when the government's hands will reach the essentially urgent problems of naval aviation.

Of course, carrier-based aviators have more problems than I am capable of including in these remarks. The shipbuilders, aircraft designers, and aircraft builders also have problems. The new understanding of the country's security that was set forth in the recently approved Russian Federation military doctrine places these problems among those of state importance. It is hard to imagine a priority direction of the structural development of the Russian Armed Forces, like the creation of mobile forces which the doctrine discusses, without the development of a modern navy and its most important components.

Preparation of Nuclear Subs for Patrol Raises Concern

94UM0391F Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) pp 44-45

[Interview with Capt 1st Rank K. Maklov, nuclear-powered submarine commander, by Capt 1st Rank B. Tyurin: "Is the Ship Ready for Patrol?"]

[Text] **Strange as it may seem, although the number of combat patrols sailed by ships of the Russian Navy had decreased dramatically, patrol service has not only become more intensive for the crews, but most importantly, it has become harder. The reasons for this were explained to me at the headquarters of one of the nuclear-powered submarine formations of the Pacific Fleet. The truth is that because hundreds of ships of the fleets, including several dozen nuclear-powered submarines, were retired in recent years, and because of the insufficiency of repair support to the few survivors needing repairs, the numbers of which are constantly growing, we are forced to make more active use of ships that are technically serviceable, and use their**

life right up to the limit. After all, the country hasn't relieved Black Sea Fleet submariners of their mission of "keeping their powder dry," or all the more so the strategic nuclear forces of their mission guaranteeing stability in the world. This is why we saw several different submarines being prepared simultaneously for combat service at the Far Eastern submarine base we visited in fall of 1993.

One of them is under the command of Captain 1st Rank K. Maklov. He is an experienced submariner who spent his entire career under water, and he has commanded this particular crew for over two years. Our short interview (the ship was being made ready to set out to sea) occurred in the control room. The main thing I wanted to clarify was this: Did the commander feel his ship to be fully ready for patrol? Konstantin Gennadyevich said the following.

There were more than enough problems before, but now they've become extremely worrisome. They concern both people and equipment. The thing I'm most concerned about as a commander is the youthfulness and, consequently, the lack of experience of the crew. And although it is 78 percent manned by "our own" people and only 22 percent manned by men "commandeered" from other submarines of the same class, which isn't bad by today's yardsticks, hardly any of them underwent training at a special training center. Before, such training was carried out a minimum of twice a year, but now that this center is on the territory of another state, and is being disbanded, the training has not been conducted for several years. As for when a new center will be ready, no one knows. At the old center, the crews underwent training for almost two months, purposefully and continuously, which did a great deal to raise the level of knowledge and training of all categories of personnel, and which improved operation and ensured accident-free use of the ship's weapons and equipment. The one saving grace is that there are experienced officers and warrant officers in the crew who have participated in many cruises. But today they are doing everything they can to get posted ashore, or even to demobilize. Consequently, what we have basically are young officers (with ranks of senior lieutenant and captain-lieutenant); moreover four are last year's graduates and nine are this year's. Who is going to teach them, and transmit experience to them? The older comrades of course, who had undergone the normal course of training. But aboard our submarine such officers are few and far between.

Yes, today neither department commanders nor service chiefs are interested in further service aboard ship. It has become much more difficult to serve here, mainly because experienced warrant officers are leaving, and the young replacements exhibit an increasingly lower level of both general educational and special training, and most importantly, a progressive indifference towards service. Thus, while in former times officers of our formation had to compete for appointments to higher positions, today such competition simply no longer exists, because officers are not aspiring for career advancement. For example, quite recently there was only one applicant in the entire formation for a vacant gunnery department commander's position of a ship just like this one. And so, before setting out to sea or on combat patrol, we are forced to beef up each other's crews with more-experienced submariners. And those who are required to serve on other than their own ship do so reluctantly. As a result, all of this leads to shortcomings in servicing the equipment, and even to its breakdown.

In turn, the equipment is also aging. We can fulfill only up to 70 percent of the required volume of restoration work through our own efforts. When it comes to drydock inspection of the hull and systems, plant workers have recently been doing this work in the so-called "limited" variant. Consequently, we find the condition of the ship's personal conveniences something to be concerned about today, even on the eve of setting out to sea. We are witnesses to the change that has occurred in the attitude of the leadership of our local naval ship repair plant to fleet orders. Today it is much more concerned with "hard currency" repairs, while submarines, and particularly their dry-docking, have been relegated to secondary importance.

It is no longer a secret to anyone that the problems that have accumulated in maintaining the technical combat readiness of ships, especially missile-carrying submarines, are reaching a critical point. Certain routine maintenance operations are not being carried out at all today on some of our special equipment. Such work is within the means and abilities only of special production personnel representing the manufacturing organizations and enterprises, which had previously been fully responsible for the promptness and quality of such work on items of equipment, weapons or apparatus of their own manufacture. Only these specialists, and not ship personnel, are permitted to carry out such work, or all the more so to repair the products of these enterprises. Now that economic ties have been broken, and especially now that a sizable number of such enterprises have found themselves outside Russia, this problem is screaming out to be solved.

We should add to all of this the "interruptions," to put it mildly, in the supply of technical and boatswain's equipment, spare parts and accessories, and POL. As for what all of this leads to, let me explain using our submarine as an example. When we go out on patrol, we do so without the volume of spare parts, tools and accessories specified by the norms. The appropriate services explain to us that the sets of spare parts and tools are unavailable at the storage depots because they are not being replenished, even though orders for deliveries are submitted regularly. Things are also very poor in regard to the supply of special tools. We were just recently able to more or less replenish what we needed, though it took a great deal of effort. Even so, we had to borrow from neighboring ships, which means we left them completely "naked." And special tools aren't the worst of it—it's now been 4 months that we haven't received any cleaning cloths or industrial-grade alcohol. Scarce grades of fuel and lubricants are issued only for combat patrols. We found the

freon we need for the fire extinguishing system with difficulty. I can go on with this list for a long time yet, but let me talk just a little bit about food.

They won't of course allow us to go to sea hungry. However, certain products are regularly substituted today on the basis of a hard-to-understand system of calorie content. In addition, in the past we used to receive a lot of preprocessed food. It has now practically disappeared. Not only does the quality of food preparation in the specific conditions of a submarine suffer in this case, but also the galley equipment, which is not adapted to processing such food products, is overworked, and people have to be pulled off their watches for this work as well. One problem raises another. The new assortment of food products comes in packaging that does not meet the norms of storage and use aboard a submarine. The abundance of glass compels us to break up all of these jars before dumping them overboard, and I need not explain how inconvenient and bad this is under the conditions of a submarine.

And one final thing. As we talk, the ship is being prepared to go to sea, but there are only 20 percent of the authorized number of officers aboard, and around 25 seamen and petty officers are absent. Rather than doing work aboard ship and preparing their materiel, they are dealing with problems in various shore-based services. When a ship is at its base, the personnel are generally taken away from their planned lessons and combat training measures on a continual basis. Sometimes 70 percent of the crew is taken away from its duties in this way. This is associated mostly with the present system under which the submariners have to see to crew life support on their own. But various all-hands jobs, many off-ship details, and other measures are frequent as well.

All of this doubtlessly has to have a negative effect on the quality of the professional training of all categories of the crew. Besides others, there is this criterion that graphically characterizes the decline in the level of professionalism: While literally just 2 years ago there were almost three dozen masters of military affairs aboard ship, and our crew was the formation's leader in this, now there are only three or four persons. Presence of a large number of top-class specialists even allowed us to carry out some renovation and auxiliary work aboard the submarine by our own efforts. Now this is no longer possible. In addition after we return from sea, another four of the best-trained specialists will probably be leaving the crew. And what's going to happen when the last master of military affairs leaves? Unfortunately, we can't see even the semblance of an effort to rectify the situation. Could it be that something is being done, but the results haven't made themselves known at our level yet?

We will be leaving for sea this week, and we will doubtlessly apply all of our strength in order to complete the missions of alert duty. I need not say anything about their importance and complexity. I feel that we will be capable of fulfilling our patrol successfully. But do I feel some anxiety? Certainly. I don't know a single person and all the more so a commander, who has ever set off for a cruise of any length who wasn't troubled deep within his soul: Will everything fall into place, and will he be able to successfully overcome all difficulties and surprises that seamen, and especially submariners, encounter at sea? Worries about family left behind on shore also intensify such anxiety today. Even with our support, things aren't easy for them, and how are they going to deal with the everyday problems in our absence?

Still, it is our hope that when we return, we will be met by changes for the better, slight though they may be.

Weapons and Equipment

How the Large Antisubmarine Warfare Ship 'Vasiliy Chapayev' Was Lost

94UM0389F Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 59-60

[Article by Captain 1st Rank B. Tyurin: "How the Large Antisubmarine Warfare Ship 'Vasiliy Chapayev' Was Lost"]

[Text] In the brigade of antisubmarine warfare ships which Captain 1st Rank I. Bolshedvorskiy commands, ships, that are either being prepared to be written off or have already been written off and are now subject to being cut up for scrap, compose an entire group. You can immediately determine them because the radar antennas, artillery, torpedo, and antisubmarine warfare weapons on them have been partially or completely dismantled and—although the St. Andrew's Flag is fluttering on the flag staffs—the watch crew is rarely seen on the decks, already not talking about other members of the crew. Of course, we can't even talk about the brilliance and cleanliness that always was inherent to even old surface combatants, and especially to the "large" ones that are in the line.

Today the Design 1134-a "Admiral Oktyabrskiy" and "Vasiliy Chapayev" large antisubmarine warfare ships (BPKs) and also several Design 1135 escort vessels (specifically, the "Gordelivyy" and "Poryvistyy") are among those ships. As they told me at the Pacific Fleet technical directorate, by way of illustration, the "Vasiliy Chapayev" BPK, due to current circumstances, did not serve the prescribed period (18 years have not passed since its entry into the line). Today, its fate is far from a conclusion and, unfortunately, not only for the Pacific Fleet. "Vasiliy Chapayev" BPK Electromechanical Department Commander Captain 2nd Rank Oleg Ivanovich Isakov shared his pain with me, let's state it quite frankly, for the tragedy of his native ship.

O. Isakov is a "Chapayev" veteran; he arrived here immediately after graduation from the Higher Naval Engineering School imeni V.I. Lenin in 1980. He began as commander of the machine-stoker division, having served in that position for three years. In 1983, he performed the duties of brigade assistant flag engineer

and the next year he was once again on the "Chapayev" in the position of traffic division commander. From 1985 until the present time (nearly 10 years!)—BCh-5 commander, master of military affairs. He had the opportunity to participate in the "Chapayev's" last combat service and to "place" it, as it turned out, in its last repair which has also not been completed, during the course of which the ship's fate was drastically altered...

"... If you glance at 'Chapayev's' biography and its service record, it becomes obvious that this is a ship-laborer. The first combat service was immediately after its transfer from Leningrad where they built it. Then, in the winter of 1979 during the military conflict between China and Vietnam, the BPK ensured our state interests in that area. In 1982-1983, combat service in the Indian Ocean, in 1985-86—in the South China Sea with the accomplishment of inter-cruise repairs at the Soviet Naval Base on the territory of Vietnam—at Cam Ranh Bay."

What happened to the ship, equivalents of which serve a somewhat longer period abroad? Who could have assumed that a turning point in the ship's fate would occur in May 1987 when the BPK, under its own power, entered the water area of Vladivostok Naval SRZ [ship repair plant] No 178 and was moored there to accomplish medium repairs and that the "Chapayev" had arrived at the location of its "death"? No, at that time the crew began to repair the ship with confidence in the ship's future.

"...The first ring of the impending 'crash' was heard on the ship already at that time when, in accordance with the protocol of the approval of the volume of work and other documents that regulated its repair and which were approved in that same year—the beginning of work was determined to be February 1988, that is, nearly a year after its arrival at the plant! But they considered this to be the result of temporary financial difficulties and our bureaucratic red tape. Both this and subsequent years were devoted to dismantling some of the equipment that was designated for replacement or for its restoration for defects, after which the plant finally began the unhurried repair of the ship practically only since 1990, having begun hull work on the BPK itself and repair of mechanisms removed from it in the shops. The situation was complicated by the fact that, according to ship operating standards, all of that should have already occurred in 1987; that is, 11 years after construction but was begun 14 years later. But this was nothing new for the navy!"

The "alarm bell" sounded with all its might when it became clear that the plant would be able to begin the partial assembly of repaired equipment only at the beginning of 1992. Moreover, all of that affected first of all that equipment that ensures the ship's survivability—even its anchoring at the plant was not safe without that. You can imagine the state of the "Chapayev's" crew which, from the time of the survey of defects and the disassembly of the mechanisms at the end of 1989 and docking (at that time, they had removed the shafts and screws, approximately 40% of the organic bottom-side fittings from the BPK, having temporarily capped the openings that had been formed in the hull) had awaited the beginning of the reassembly of the repaired fixture for three whole years! Nevertheless, this "process sort of proceeded". Since the beginning of the year, they managed to accomplish the assembly of two diesel generators, two electrical fire-fighting pumps, 40% of the electric fans of the ship electrical fire-fighting system, the steam-ejection refrigeration units, one evaporation installation, an electric windlass, (ship's personnel themselves repaired its electromechanical portion), galley cooking stoves, boilers and some other work. Although all of this could hardly have provided what was necessary for life support and everyday activities of ship personnel but, as they say, it was as if "light had appeared at the end of the tunnel". They already practically did not recall that the "Vasiliy Chapayev" BPK's initial planned repair period was designated in 1988 with completion of the work in 1991. Everyone understood: The problems of supplying ZIP [spare parts kits] and deliveries of other materials had been exacerbated as a result of perestroyka in the country and in the Navy: They saw that there was a continuous drain of cadres at the plant and that there weren't enough workers. And yet the hope had emerged among the crew that they would repair the ship...

The primary misfortune arrived in the summer of 1992. In that year which it is customary to consider as the beginning of the new era in Russia's history, it turned out that there wasn't an approved budget in our country for the first time(!)! At that time, the Navy's command authorities issued a directive on "cessation of repair and writing off ships in December 1993". In accordance with it, they removed "V. Chapayev" from the plant in September and put it on the ship brigade's own wharf (33rd slip), and without restoring the heating system and with a total of 50% of the fire protection system on line. The mechanisms and electrical equipment that had been submitted for repair practically all remained there..."

However, while objectively examining what had happened with the "Vasiliy Chapayev", we must admit that the conditions for such a finale had already developed not in 1992 but significantly earlier. They had arisen already at the time when they had been compelled to place the BPK for repair at that ship repair plant which, in contrast to the other—Vladivostok's "Dalzavod" Ship Repair Enterprise, was not prepared to repair these ships. Indeed, while striving to find a solution from its "dead end situation", the Pacific Fleet's Technical Directorate and SRZ No 178 reached an agreement with "Dalzavod" on the involvement of its specialists in the repair work on the ship's boilers, its main turbogear assemblies, and on an entire series of other systems and mechanisms associated with the power plant. However, in the future, as a result of the establishment of new financial relations, previous contractual obligations ceased to have force. This was the next major cause of the nonfulfillment of the appropriate volume of work. And the dramatic restriction of financing of the Navy in 1992 placed a period to the fate of this (yes and others)

ships of that same Pacific Fleet in a similar situation. And another series of causes of "premature death" during recent years have graphically illuminated the Pacific Fleet's extremely unsatisfactory technical support—the low level of training (first of all, special and repair) of all types of ship personnel (especially in recent years), beginning with compulsory service personnel and ending with officers and warrant officers.

What awaits "Vasiliy Chapayev" in the foreseeable future? The crew has been officially told that "the manning levels on the ship are being closed on 31 December 1993". After that, they will tow the ship to a dock to conduct work on conversion, that is, welding side openings and accomplishment of other measures to ensure that it is kept afloat. Part of the crew will be on the BPK until the work is completed. However, the completion of this work and its time period will depend on the availability of financial resources and the ship will be at the wharf for the time being. But on it today are only 10% of the actual personnel strength. There are a total of eight personnel in the 104-man (according to approved strength) electromechanical compartment! The usual undermanning for the repair period has exceeded all limits with the "Chapayev's" departure from the plant. After obtaining the directive on writing off this ship, the "Chapayev's" crew did not receive a single junior seaman! A new question: How do you ensure safety while anchored if it is not extended?

But, it was as if everything was clear about the ship's fate—the decision had been made. And what are the officers' prospects for future service? Some of them (first and foremost, junior officers and, of course, those officers who agree to continue to serve under these conditions and with this type of experience) will be assigned to other ships and military subunits. For others, service in the navy will sooner end...

Almost everything said about the "Vasiliy Chapayev" is close to the fate of the other ship of this design, the "Admiral Oktyabrskiy" and its crew. In conclusion, I need to say a few words about the escort ships "Gordelivyy" and "Poryvistyy". At the present time, they also are "ships of sediment". Indeed, one third of the authorized crew strength that is currently on them does not know its future prospects. What will the near future yield for their ships: Will they be repaired or will they also be written off?...

Design History of First Cruiser Helicopter Carrier Told

94UM0391G Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) pp 70-75

[Article by Arkadiy Borisovich Morin: "Project 1123 Cruiser Helicopter Carriers"]

[Text] **The prototype of a fundamentally new class—the cruiser helicopter carrier, the principal armament of which consisted of ASW helicopters, the latest missile systems and electronic equipment, entered the composition of our navy in 1976. Having relatively low displacement, it had no equals in foreign fleets of those times in terms of the effectiveness of searching for and fighting submarines.**

Following publication of the article "Cruiser Carriers" (see MORSKOY SBORNIK, No 7, 1991) by Captain 1st Rank V. Kuzin, which contains brief information on these cruiser helicopter carriers, the editor's office received many letters requesting more details on them. Therefore, we offer the reader the recollections of a participant of its planning, Arkadiy Borisovich Morin, who at that time was the chief of the planning division of the TsKB-17 [Central Design Office No 17]—the principal executor of efforts to create our first cruiser helicopter carriers (presently the Nevskoye Planning and Design Office).

The scientific and technical revolution that began soon after World War II had a great influence on development of naval equipment. It universally brought on fundamental changes in views on the role of naval fleets in the new conditions. The United States of America, which was the undisputed leader among sea powers at that time (and even now), was the first to reexamine the priorities of its navy's missions. It was then that use of the world ocean as a "launch pad" for ballistic missiles carrying nuclear warheads, launched from nuclear-powered submarines (SSBNs) and targeted chiefly on the most important objectives in the USSR as its main enemy, assumed first priority.

At approximately the same time, the Soviet Union decided to create a nuclear missile ocean-going navy capable of carrying out the entire complex of missions at sea to defend the interests of the state and counter possible aggression against it from the seas and oceans. One of the necessary components of a balanced navy was recognized to be presence of effective antisubmarine warfare (ASW) forces within its composition, including nuclear-powered and diesel torpedo submarines, shore-based and ship-borne ASW aviation, and surface ships of various classes equipped with submarine search and destroy resources.

Creation of surface ASW forces began with modernization and improvement of the armament of destroyers and patrol escorts in the navy at that time, and refitting of some first-generation missile ships into ASW ships. Then began planning and construction of specialized ASW ships. However, the advent of American SSBNs carrying Polaris-A1 missiles (with a range of up to 2,200 km) raised the issue creating ASW ships for our navy that could operate in the outer ASW zone and would satisfy high requirements on armament, navigability, range and endurance.

In its search for an optimum direction of solving this problem (optimum according to the criteria of combat and economic effectiveness), the TsNIIVK [Central Scientific Research Institute of Military Shipbuilding] (presently the Central Scientific Research Institute No 1 of the RF Ministry of Defense) conducted comprehensive research jointly with other naval and air force

institutes as well as the TsNII-45 [Central Scientific Research Institute No 45] and the TsKB-17 of the USSR State Committee for Ship Building (GKS), later transformed into the Ministry of Ship Building Industry. Their results persuasively demonstrated that successful combat with nuclear-powered submarines, chiefly SSBNs, required wider use of ship-based aviation. A continuous search for submarines over vast and remote regions over the course of several days and integrated operations against detected submarines jointly with other naval forces had to be provided for.

Basing itself on the results of this research, the TsKB-17 wrote up, and submitted in 1958, technical proposals on designing two classes of helicopter carriers—small (based on a special design) and large (based on mothballed hulls of unfinished project 68-bis artillery cruisers awaiting "resolution of their fate"). Defense Minister R. Malinovskiy gave his support to both variants, and they received approval in the government.

The project requirements, which were approved by naval commander-in-chief S. Gorshkov on 31 January 1959, defined the purpose of such a ship: "Seeking and destroying the enemy's SSBNs and multipurpose submarines in the outer ASW zones within the composition of a ship hunter-killer group and in coordination with other naval ships and ASW airplanes." The objective was to "provide for continuous 24-hour searching for submarines by not less than two helicopters during the ship's entire cruising time." On the basis of the project requirements and with regard for results of rough plans drawn up on their basis, with the participation of a number of naval and air force institutes, the TsNIIVK prepared the draft preliminary specifications for the design of a ship with minimum displacement carrying eight helicopters. (This corresponded to views of higher organizations upon which creation of the new ships depended).

Concurrently, the TsKB-17 established the need for designing a ship of greater effectiveness and ability to resist the enemy. Considering the real limits placed on use of helicopters in strong winds, the office proposed reinforcing the ship's submarine detection and strike resources by including in the preliminary specifications a long-range sonar system, an antisubmarine missile system, torpedoes and mortars, and air defense resources. Supporting the TsKB-17 the TsNII-45 raised the question as to the suitability of increasing the number of helicopters aboard. The navy and the GKS also insisted on basing 10-14 helicopters aboard the ship.

After the initial studies were carried out to determine the principal ship building elements more specifically, and after the specifications were coordinated with the GKS, on 25 January 1960 the naval commander-in-chief approved the preliminary specifications for the design of the ship, which was code-named project 1123. However, when he forwarded the assignment to the TsNIIVK, G. Kozmin, chief of the navy's Main Ship Building Directorate, emphasized: "Considering that attention is being turned at many levels of government to the standard displacement of a ship, the work of the TsKB-17 and supervision by the navy should be oriented on arriving at a more sensible solution to all design problems and implementing all measures to reduce the displacement (7,000-8,000 tonnes) indicated in the preliminary specifications." For the same purposes, the GKS received conceptual designs submitted on a competitive basis by both the TsKB-17 and the TsKB-53.

A. Savichev (1904-1983), who formerly led the designing of project 68K and 68-bis artillery cruisers, was appointed chief designer of the ship at the TsKB-17. V. Fedin became the chief observer from the TsNIIVK. A. Fisher, who was the chief designer of the project 30-bis and 56 destroyers, was put in charge of the conceptual design at the TsKB-53.

The project was carried out at the TsKB-17 in close cooperation with the OKB-938 [Special Design Office No 938] of the State Committee for Aviation Equipment (GKAT), headed by N. Kamov (who designed the Ka-25 helicopter), and specialists of the air force's Scientific Research Institute No 15 supervised development of the ship resources of the ASW helicopter system. The office submitted eight variants of the ship offering different propulsion units and different armament packages, to include in a catamaran scheme. During the search for new technical concepts, and particularly to reduce displacement, a variant with an aluminum-magnesium alloy hull was additionally developed on the initiative of the chief hull designer A. Marinich (1909-1989), but it did not enjoy any support.

Studies showed that the prescribed displacement could be obtained with a steel-hulled ship by equipping it only with a gas turbine propulsion unit. However, this variant was rejected, as was the plan developed by the TsKB-53. The final decision was to continue the planning on the basis of a variant calling for a boiler and turbine propulsion unit, similar to the main propulsion unit of the "Groznyy" class guided missile cruiser (project 58), which made it possible to increase displacement to 8,500 tons.

The main elements of the preliminary specifications were approved by a government decree almost at the end of work on the conceptual design, on 29 September 1960, while the conceptual design itself was completed on 1 December of the same year. Of course, the office was instructed to carry out additional studies to improve the helicopter technical maintenance conditions, to foresee the possibility for basing progressive [perspektivnyye] helicopter models on the ship at sea states of up to 6 points inclusively, reduction of the crew to 300-350 (by extensively introducing automation), reduction of displacement by combining personal-service systems and other devices, accommodation of personnel according to submarine, escort vessel and destroyer norms, and exclusion of redundancy in technical resources, posts and so on. As a result, another 16 variants of the project appeared, and out of all of them, what was referred to as variant 23 with a displacement of 9,300 tons was

approved on March 1961 as the basis for the detail design, though with a general orientation on reducing its displacement.

It should be noted that the work of designing the ship's principal armament—the ASW helicopter system—encountered serious difficulties due to the absence of approved "requirements on grouped basing of helicopters aboard ships" at that time. The TsNIIVK began developing such requirements only concurrently with work on the cruiser's plan. However, immediately after approval of the conceptual design, the air force institute suddenly reported that "its new manning structure did not foresee the function of supervising the planning of ships with helicopter armament in industrial central design offices, for which reason the group of observers is being disbanded, and beginning in 1961 observers will not be appointed to ship projects." Numerous appeals by the navy and the GKS to the air force command regarding the need for reinstating supervision produced no results. In addition, the air force and the GKAT were late in providing the basic data on progressive ASW helicopters, mentioned in the government's decision, as a result of which development of the ship's detail design was based on data from the OKB-938. But when the detail design was nearing its completion, the air force reported that "the Ka-25 helicopter adopted by them cannot be said to be sufficiently progressive in terms of its performance characteristics and the composition of its equipment and armament." It became necessary to convene an expert commission.

The detail design that was submitted for examination was for a ship of standard displacement of 9,000 tons and a speed of 29 knots. The number of ship personnel was determined at 370. In its conclusion on the project the TsNIIVK proposed increasing the crew by 31. The naval commander-in-chief ordered the Main Staff to examine this question. With regard for the requirement of maintaining a three-shift underway watch at the main battle stations during a length sea cruise, the latter substantiated the need for a manning level of 497 persons. During joint examination of the justifications the TsKB-17, the TsNIIVK and the naval Main Staff compromised on a crew of 415.

Detail design 1123 was approved on 25 January 1962. A number of amendments and supplements were of course once again introduced into it, to include: the possibility for landing 14 progressive Ka-25 and Mi-8 ASW helicopters on the ship, increasing crew size, changing the composition of radio communication resources, and raising the ship's navigability at a sea state of 6-7 points—which made it possible to increase its standard displacement to 10,600 tonnes, with the corresponding decrease in speed and cruising range. The TsKB-17 was instructed to make the corrections to the project by May, and to transfer the first set of working drawings on the hull to the plant, so that the prototype could be laid down in that same year, 1962.

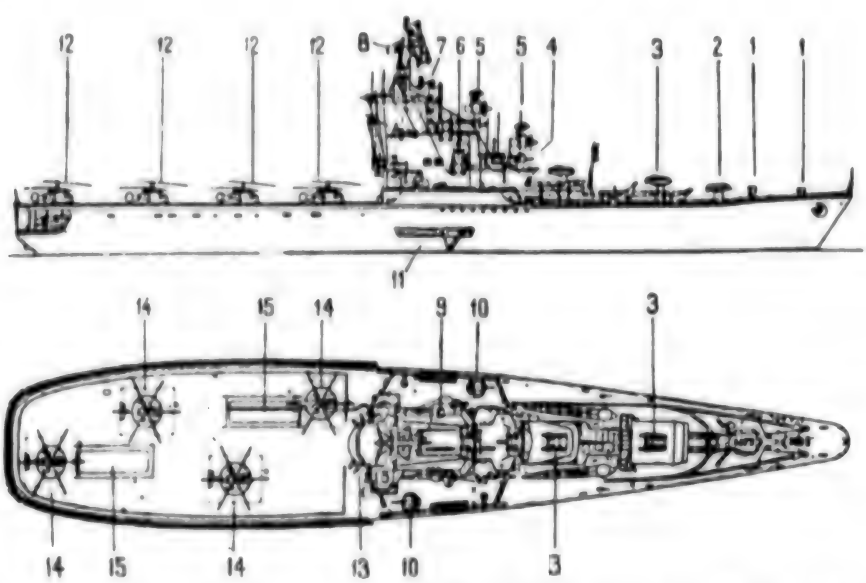


Diagram of the General Arrangement of Weapons and Armament Aboard the Cruiser Helicopter Carrier "Moskva" (a—side view, b—top view): 1—RBU-6000 mortar; 2—twin launcher of the Vikhr ASW missile system; 3—twin launcher of the Shtorm UZRK [all-purpose surface-to-air missile system]; 5—antenna station of the Shtorm UZRK fire control radar; 6—ECM antenna station; 7,8,9—radar antenna stations; 10—57-mm twin artillery mount; 11—533-mm five-tube torpedo launcher; 12—Ka-25 helicopters; 13—command and launching station; 14—landing pad; 15—helicopter elevator.

Correction of the detail design revealed that in order to accommodate the progressive helicopters aboard the ship, the hangar volume would have to be increased by 81 percent, a second hangar for two helicopters would have to be set up on the top deck, and the area of the flight deck would have to increased by 77 percent. This evoked major changes in the main dimensions and in the theoretical outline of the hull. As a result, the ship's standard displacement grew to 10,750 tonnes, while speed dropped to 28.5 knots.

Designing of the ship was seriously complicated, besides by several changes in the initial data on the helicopters, by presence of considerable quantities of experimental and prototype armament still in the design stage. Consequently, the office's designers had to work with the technical data and even the conceptual designs of these models.

One other thing should be noted. Construction of a ship of a fundamentally new class, which required a complex cooperative effort in delivering armament, equipment and materials, was complicated by reorganization of the country's industrial management system on a territorial principle beginning in 1957. As a result, the TsKB-17 had to draft the government decree "On Approving the Basic Elements and Providing for Construction of the Prototype of an Outer-Zone ASW Ship." It foresaw participation of around 200 enterprises and organizations of five sector state committees, two RSFSR ministries, the All-Russian Council of the National Economy, and republic and territories councils of the national economy in designing the cruiser helicopter carrier. This also necessitated additional work and coordination of the supply plan with the executors and higher organizations.

In the course of planning the ship, the office and its contractors successfully solved a number of new troubling problems in practically all specialties with the participation of naval and air force specialists for the first time in Soviet ship building experience. Special attention was naturally devoted in this case to resources of the ASW helicopter system. Items developed as part of these resources included: a helicopter transport system that was semiautomated (providing for longitudinal and transverse towing in the hangar) and mechanized (using tractors on the flight deck); helicopter elevators making the most economical use of hangar space possible; fuel, oil, nitrogen and hydraulic systems, and helicopter electric power supply.

The flight deck (with the main hangar beneath it) was foreseen in the aft part of the cruiser helicopter carrier as being the best protected from wave action in the presence of strong winds.

That left the fore part to accommodate the ship armament systems. Because of this the ship acquired such an unusual architecture that it was jokingly named a "half a steamship." Another characteristic feature of the cruiser helicopter carrier was presence of a high-power, long-range sonar system (employed for the first time on surface ships not only in our country but even abroad!). Owing to its considerable dimensions, its acoustic system was installed inside a retractable faring beneath the keel (with dimensions of 21x6.5x9 m), which had a raising and lowering device of unique design. An entire series of special measures had to be developed and implemented aboard the ship in order to reduce acoustic interference during operation of the sonar system and in order to support its prescribed range.

There were many other unique design features as well. Thus, much attention was devoted during planning of the hull to making it resistant to hits by enemy missiles and torpedoes, and the top deck above the hangar (with an area of around 2,000 m^2) was built with a unique design requiring a minimum number of supports. The following were located aboard a ship for the first time: an automated system for controlling water systems; electric systems for automatic or remote control of impulse valves, ventilation covers, fuel receiving and transfer fittings, and water protection; a fast-acting firefighting equipment activating system. A new anchoring device making it possible to weigh anchor without requiring personnel on the top deck was developed during the planning. Basing of the helicopters required development of special devices: fire curtains in the lower hangar, doors to the upper hangar, and an automated collapsible railing on the flight deck. Controllable fin stabilizers were used as roll stabilizing devices, as being the most reliable and effective in comparison with active and passive stabilizing tanks.

The project 58 guided missile cruiser adopted as the basis for the main propulsion unit was modified and improved. The productivity of the main boilers was raised in connection with the increase in steam consumption. Auxiliary boilers and automated desalinization and evaporating units were designed anew. The ship's electric power supply system foresaw the full volume of automation of both power plants. New models of electrical equipment were developed on instructions from the office: automated turbogenerators and diesel generators, synchronous generators with an amplitude-phase compounding system, automatic starting switches, and so on. In the course of planning the electric power system, with the participation of the Naval Academy, the office solved a number of complex technical problems in order to provide for:

- reliable, lengthy parallel operation of generator units equipped with different kinds of primary engines and with speed governors having different dynamic characteristics;
- the needed quantity of electric power in the presence of major consumers which additionally imposed sharply pronounced pulsed and cyclic load requirements;
- the necessary dynamic and statistical stability of generators.

At the same time, the fight to reduce displacement was very much complicated by the need for creating good living conditions for the personnel. Considering the ship

unsinkability requirements and protection against mass destruction weapons, portholes had to be rejected in the main hull. Nonetheless, the design foresaw one-and two-man cabins with an area of 5-6 m^2 for officers, four- and six-man cabins with an area of 6-12 m^2 for warrant officers and chief petty officers with the beds arranged in two tiers, and, for the crew, mess decks with a space norm of 2.1-1.2 m^2 per person and with beds arranged in two tiers. A ventilation and air conditioning system and soundproof partitions were installed, soundproofing and noise suppressing devices were employed, a maximum amount of plastic furniture was introduced, and thought was given to the architectural and interior design and color scheme of living and public spaces. A ward-room was foreseen for officers and chief petty officers, and two messes with a centralized dishwashing facility were foreseen for the crew.

[Sentence incomplete in original]...after the TsKB-17 sent the planning documents and orders to the manufacturing plant in June 1972 together with the initial working drawings for the hull. In July the corrected detail design was approved, but as it turned out, the drama surrounding the designing of the ship did not end with this. During N. Khrushchev's visit to the Northern Fleet (in summer 1962) the navy and the GKS were instructed to "significantly increase the endurance of warships and widen their sailing region." After this, the main developer of surface-to-air missile systems submitted a proposal to the naval command and to the leadership of the corresponding sector state committees to increase the ammunition reserve aboard ships by reexamining the design of the surface-to-air missile storage and delivery system, as a result of which instructions were given to carry out the corresponding studies, to be followed by instructions to study installation of a radar station aboard the ship that was more powerful than the present one. These and other instructions necessitated development of 26 variants of particular changes for examination. And later on, during publication of the working design documents, consideration had to be given to new decisions and orders of the navy and the GKS (Ministry of Ship Building Industry), changes in standards and the minutes of technical meetings.

When it published the design documents, the TsKB-17 devoted great attention to checking the ship's weight distribution. On instructions from B. Chilikin, the chief of the TsKB-17 and its chief designer (1905-1967), each week the planning division submitted a summary of the current loading conditions (with regard for published drawings) and the position of the ship's center of gravity for his approval. He also made the final decisions when approved weight limits and their moments (on three coordinates) were exceeded.

In late 1965 the TsKB-17 carried out test calculations of the ship's stability and its ability to remain afloat when damaged, and tested dangerous cases of flooding with a scale model (1:50) in a physical modeling laboratory created in the office. The results turned out to be somewhat worse that the calculations carried out when correcting the plans. In order to meet the unsinkability specifications, recommendations were drawn up to increase the quantity of liquid ballast used in tanks after they were emptied. These recommendations were approved by the navy and the GKS by their decision in August 1966.

A decree of the CPSU Central Committee and USSR Council of Ministers foresaw construction of two ships on the basis of project 1123. Captain 1st Rank A. Khokhlov was appointed chief observer from the navy, and N. Prudnikov was appointed the chief builder of the prototype, which was christened the "Moskva". This cruiser was laid down on 15 December 1962 in Nikolayev at a large building dock of Plant No 444 (presently the Chernomorskiy Sudostroitelnyy Zavod Production Association) under rather mundane circumstances. After the two bottom sections of the hull were installed and a field joint was welded between them, plant director A. Gankevich and naval GUK [shipbuilding main administration] representative N. Grushin signed the ship's lay-down certificate on a table covered with red fabric standing beside the hull. In this case, only a few dozen plant workers and seamen and a small group of specialists who had to come to Leningrad from the TsKB-17 under the leadership of the project's chief designer, A. Savichev, were in attendance. But when the ship was lowered into the water on 14 January 1965, it was under festive circumstances, in the presence of several thousand people, and it was a major event at the plant.

The initial general timetable called for completion of construction of the prototype in 2.5 years; however, changes in the plans that had been approved in 1962 in the course of construction itself, a number of alterations, and late deliveries of the main armament and equipment increased the volume and laboriousness of the work. Consequently, the mooring trials of the "Moskva" went on from November 1966 to May 1967, plant sea trials were held in May-August, and state trials were conducted in August-December 1967. The state trials were conducted by a government commission under the leadership of Rear Admiral B. Lamm. His deputy was the new chief designer of the project, A. Marinich, who replaced the retiring Savichev in March 1967. After the state trials were completed Captain 1st Rank F. Starozhilov was appointed ship commander. (He replaced the first commander of the cruiser helicopter carrier "Moskva" G. Kopylov, who commanded the crew from February 1965). V. Konovalenko was appointed the manufacturing plant's chief inspector during the sea and state trials; (they were conducted in the Black Sea).

During the state trials around 100 Ka-25 helicopter sorties were flown day and night, in good and adverse weather, with the ship both at rest and under power, and with different specifications of heeling, trim and speed of the resultant air flow above the flight deck. The results confirmed that the shipboard resources of the ASW helicopter system met the requirements completely.

By the beginning of this stage of the trials 19 new models of weapons and equipment not yet adopted by the navy had been installed aboard the ship. They were checked out and accepted simultaneously with the ship, which

significantly complicated the organization and conduct of the trials. After their completion, on 25 December 1967, a government commission accepted the ship into the navy. It was noted in the acceptance certificate that the latest models of armament and equipment installed aboard the cruiser helicopter carrier would keep its specifications and performance characteristics at a modern level for a long time to come (see Table).

Basic Specifications and Performance Characteristics of the Project 1123 Cruiser Helicopter Carrier and of Cruiser Helicopter Carriers of Foreign Navies

Ship	"Moskva"	"Jeanne d'Arc" (France)	"Andrea Doria" (Italy)	"Vittorio Veneto" (Italy)
Year commissioned	1967	1964	1964	1969
I. ARMAMENT				
Aviation:	14 Ka-25	8 Lynx, Super Frelon	4 AV-212	9 AV-212
number of landing pads	4	2	1	2
number of elevators	2	1	-	1
ASW:				
missile	1x2 Vikhr ASM launcher	-	-	1x2 Asroc launchers (combined with SAM launchers)
torpedo	2x5 533mm torpedo launcher	-	2x3 324-mm torpedo launcher	2x3 324-mm torpedo launcher
mortar	2 RBU-6000	-	-	
Surface-to-air				
missile	2x2 Shtorm guided SAM launcher	-	1x2 Standard launcher	1x2 Terrier SAM launcher
artillery	2x2 57-mm artillery mount	4x1 100-mm artillery mount	8x1 76-mm artillery mount	8x1 76-mm artillery mount
II. BASIC SPECIFICATIONS AND PERFORMANCE CHARACTERISTICS				
Standard displacement	11,300	10,000	5,000	7,500
Full speed, knots	29	26.5	31	32
Radius, nautical miles (knots)	6,000 (18)	6,000 (15)	5,000 (17	5,000 (17)
Complement	541	Around 650	470	550

After preparations for and conduct of joint trials of the ship and helicopters (with their group flights), on 19 September 1968 the cruiser helicopter carrier "Moskva" set off on its first long cruise in the Mediterranean Sea. In 1.5 months and in a complex situation of constant contact with ships and aviation of the USA and NATO, and a sea state of up to 6 points, the cruiser traveled around 11,000 nautical miles. Its helicopters flew around 400 sorties during the time of the cruise, surveying up to 10,000 square miles per day with good results in searching for, detecting and lengthy shadowing of submarines. This complex cruise confirmed the high reliability of the armament and equipment of the cruiser helicopter carrier. Creation of the cruiser and the Ka-25 helicopter was marked by state prizes.

In fall 1969 the second ship of this class—the "Leningrad"—joined the navy. In 1974, after the end of the Arab-Israeli War, it helped to clear mines from the Suez Canal (together with Pacific Fleet minesweepers) at the request of the Egyptian government. Because our country did not possess any minesweeping helicopters at that time, eight Ka-25 ASW helicopters had to be refitted quickly for this operation. The minesweepers cleared moored mines from the channel, while helicopters removed ground mines, as well as moored mines in places where ships could not operate because of reefs and shallow water. The helicopters also worked reliably and without incident in these unusual operating conditions, and their crews demonstrated a high class of piloting. In three months the canal once again became navigable. For this operation, the crews of the Soviet ships and helicopters earned the gratefulness of the Egyptian government and the USSR minister of defense.

In the mid-1980's the "Leningrad" visited the city in honor of which it was named. It stood on the Neva, not far from the building occupied by the design office that gave it life, where the collective of designers was already working on the design of new, larger aircraft carrying ships.

Both cruiser helicopter carriers sailed many long cruises and combat patrols. In 1990 the "Leningrad" was retired from the navy, while the "Moskva" is still one of the active ships of the Black Sea Fleet.

In Foreign Navies

Foreign Navies' Surface Combatants' Torpedo Defense Systems and Equipment

94UM0389G Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) pp 68-74

[Article by Captain 1st Rank V. Sukhanov and Reserve Captain 2nd Rank V. Smirnov: "Foreign Navies' Surface Combatants' Torpedo Defense Systems and Equipment"]

[Text] The development of torpedo defense systems and equipment for surface combatants and auxiliary ships continues to remain one of the most dynamic directions of R&D [research and development] and the primary orientation of purchases in the navies of foreign countries. This is explained by the fact that the command authorities of their navies view modern and future heavy torpedo submarines, especially "Soviet, that are following in the wake of the 65 class", as a serious threat to surface combatants and ships at sea. It is thought that they can be utilized in joint strikes with antiship missiles at distances that are beyond the maximum assured detection ranges of submarines that employ these torpedoes. At the same time, we note that a ship, due to its specific design features, is most vulnerable to underwater explosions, especially of torpedo warheads and, in the event of damage by torpedoes, has less chance for survival than when damaged by a missile. Therefore, according to foreign experts, along with other defense measures, we must equip the primary classes of surface combatants with a single multi-echelon torpedo defense system similar to the PVO [air defense] system, which must not only detect attacking torpedoes, suppress and deceive their guidance systems in a reliable and timely manner, but also destroy these torpedoes.

It is being asserted that there are no such torpedo defense systems on foreign surface combatants at the present time and defense from torpedoes is being carried out utilizing only towed and fired sonar countermeasures systems. And that is already inadequate to effectively combat modern and, all the more so, future torpedoes. Abroad, these circumstances have provided a priority for a number of efforts on the development of comprehensive torpedo defense systems, including, besides sonar countermeasures systems, attacking torpedo destruction systems which, in turn, have received the greatest development in the navies of the United States, Great Britain, and France.

At the present time, various types of nationally-produced towed torpedo decoys form the foundation of these countries' torpedo defense systems. In the process, sonar countermeasures systems are being combined into the comprehensive SSAWS "acoustic combat" systems (SSAWS—Surface Ship Acoustic Warfare System) on U.S. Navy surface combatants and ships. The Nixie type towed portion of the decoys, thanks to its small size, as a rule is located in an below decks space along the right side. Two towed bodies are deployed at the same time—each through its own port hole and with its own winch. On British ships, towed bodies of decoys that have adequately large dimensions (see the table), along with winches, are located in the stern on the upper deck. Other countries, for example Germany and Japan, utilize various modifications of American Nixie type decoys. However, I must note the development of national sonar countermeasures equipment on behalf of surface combatant torpedo defense systems in the Israeli Navy where today the ATC-1 small electronic-acoustic torpedo decoy has been developed at the level of modern Western standards.

At the beginning of the 1980's, work was begun, practically simultaneously, in the United States, Great Britain and France, on the modernization of existing and the development of fundamentally new surface combatant and ship torpedo defense systems based upon the SSTD (United States), Talisman (Great Britain), and Spartacus (France) programs. In the process, the American SSTD (SSTD—Surface Ship Torpedo Defense) Program consists of three independent stages.

The 1st and 2nd stages form a purely American national program that is being carried out under the management of the U.S. Navy's Sea Systems Command (NAVSEA). During the course of accomplishing the program, in the first stage, work was completed to improve existing torpedo defense systems and, in the 2nd stage, new generation torpedo defense systems were developed utilizing modern technical solutions.

In contrast to the 1st and 2nd stages, during the course of which systems which protect surface combatants and ships from modern torpedoes were developed within the framework of existing torpedo defense systems, during the course of the 3rd stage, they propose developing a fundamentally new multi-echelon system for their defense from future torpedoes with various types of guidance systems and target attack methods. While considering the system's high complexity and cost of R&D on the development of this torpedo defense system, in 1998 the U.S. and British governments decided to combine the scientific-technical and financial efforts of the two countries for the successful completion of work by the end of the 1990's.

An improved variant of the AN/SLQ-25—the AN/SLQ-25A decoy was developed during the 1st stage of this program. According to American experts, this is essentially a new development that significantly exceeds its predecessor in specifications and capabilities. Series production of the AN/SLQ-25A decoys had already begun in 1988 and deliveries of it to the navy were planned from April 1991. The overall need for them until the year 2000 was assessed at 240 systems (at a rate of manufacture of two systems per month).

In accordance with the 2nd stage of the SSTD Program, the following surface combatant torpedo defense subsystems have been developed or are at the concluding stage of full-scale development: an anti-torpedo; the

AN/SLR-24 torpedo passive detection and classification system; the AN/SLQ-36 towed combined countermeasures system and improved fired sonar countermeasures systems to suppress EX-10 torpedo guidance systems and also a countermeasures control system (CDC).

The anti-torpedo was developed based on the Mk 46 small antisubmarine torpedo. A total of approximately 70 practical launches of the anti-torpedo have been conducted during full-scale tests against a 65 cm torpedo simulator. Based upon tests results, they planned to reequip 172 Mk 46 torpedoes into anti-torpedoes in the 1993 fiscal year. Later, they propose to reequip more improved torpedoes—the Mk 50 Barracuda—because, according to American experts, anti-torpedoes must become the primary torpedo defense systems of aircraft carriers in the near future.

An experimental model of the AN/SLR-24 passive torpedo detection subsystem has already been tested on the aircraft carrier John F. Kennedy and demonstrated its capability to successfully recognize the noises of a simulator of an attacking antiship torpedo in the background of the aircraft carrier's own noise. In 1992, they anticipated the delivery to the navy of two experimental models of this subsystem. As for the AN/SLQ-36 towed countermeasures system, its development was completed in 1988.

It is anticipated that a new torpedo defense system, which consists of the AN/SLR-24 subsystem, an anti-torpedo, and a CDC type control system will enter the inventory of American aircraft carriers already in 1996-1997.

Therefore, the participation of two international consortiums headed by the firms Westinghouse and General Electric (United States) was planned at this stage of work. They propose concentrating primary efforts on the development of highly effective robotic torpedo defense systems employing artificial intelligence technology, including short-range self-defense torpedo destruction systems. The scientific-technical achievements obtained during the course of work of the 2nd stage of the SSTD Program and the SDI Program are being utilized for their development. In the process, expanded research is being conducted with the involvement of the experimental facilities of the U.S. Navy and universities.

They are examining the following systems as torpedo destruction systems: promising specialized small anti-torpedoes; anti-torpedo networks with warhead-destroyers that have been installed in the path of the attacking torpedo and various types of depth charges.

Analysis of information materials indicates that significant successes have been achieved in the United States in the development of specialized anti-torpedoes and also anti-torpedoes based on small 324 cm antisubmarine torpedoes. For example, the completion of work in 1991 on the development of a 203-mm anti-torpedo for submarines and the 2nd stage of the development of a fundamentally new navigation system for future anti-torpedoes that have a speed of approximately 40 knots and the capability to complete turns with an angular velocity of approximately 50° per second have been reported.

Full-scale testing at Los Alamos Laboratory (New Mexico, United States) has confirmed the technical capability to dispense a 5 X 5 meter anti-torpedo network from a 324-mm platform and a 10 X 10 meter network from a 533-mm platform. Deployment of the network in the path of the torpedo is carried out using four hydro-rocket projectiles which explode when the torpedo ends up in the network.

At the beginning of the 1990's, the United States developed an anti-torpedo depth charge with a diameter of the bottom portion of 373-mm and a weight of approximately 360 kg, that is capable of carrying out ricochetless entry into the water at acute angles at speeds of up to 610 meters per second at permissible G-loads.

During the course of work on the 3rd stage of the SSTD Program, significant attention is being devoted to the development of a reliable torpedo detection system that provides the time required to implement torpedo defense system measures. American experts think that the problem of detection of torpedoes requires the development of a special torpedo circuit in a centralized underwater situation information processing system. In the process, primary emphasis is being made on the development of hull-mounted and towed concentrated acoustic systems, and of acoustic systems with a GPBA [flexible towed extended sonar antenna]—torpedo detection circuits and the appropriate processing, analysis and information depiction software. It is thought that, when torpedoes are detected, their classification, determination of coordinates, and parameters of their movement must be conducted, and also detection of the main threat for surface combatants with the goal of subsequent automatic selection of the most effective technique to combat them.

A memorandum between the United States and Great Britain defines the following time periods during the 3rd phase of work:

1991—Selection of the variants of future torpedo defense systems for further work, a preliminary assessment of the cost of the torpedo defense system elements and systems on the whole and conclusion of contracts for R&D;

1992-1993—Conceptual design and selection of one basic variant of the system for each class of ships of the U.S. and British navies and determination of developing firms on a competitive basis;

1994—(second half)—Initiation of full-scale development of the future torpedo defense system; and,

1998-1999—Entry of series-produced models into the inventory.

The U.S. Navy Naval Systems Command has announced that the list of all ships on which the future torpedo

defense system will be installed will depend on its effectiveness, operational requirements and production capacity. According to expert assessments, the U.S. Navy's need for new torpedo defense systems totals more than 400 sets and the British Navy's need—is approximately 80 sets. Furthermore, it was noted that the involvement of the French Navy in the work is possible during the 3rd stage of the SSTD Program and that its needs are assessed as more than 100 sets of the new torpedo defense system.

Great Britain's Talisman Program is similar to the American SSTD Program and contains three subprograms (stages in the U.S. program): modernization of existing torpedo defense systems; development of new generation torpedo defense systems for surface combatants that are in the inventory and that are under construction; and, development of new promising torpedo defense systems within the framework of the 3rd stage of work on the SSTD Program.

The SEA SIREN Towed Torpedo Decoy, which is considered to be a next generation system, was developed based on the latest microprocessor technology during the course of modifying torpedo defense systems at the end of the 1980's in Great Britain. Like its predecessors—the British 182M and GI 738 [sic] decoys, it is designed to deflect torpedoes with active, passive and combined acoustic guidance systems away from surface combatants.

The British are applying significant efforts toward the development of fired drifting sonar countermeasures devices. So, here they developed the ATAAC 76- and 100-mm projectiles (ATAAC—Anti-Torpedo Air-launched Acoustic Countermeasure) for suppression of torpedoes' acoustic guidance systems at the end of the 1980's. A rocket-propelled projectile with a noise jamming generator has been integrated with the launchers of surface combatants of the U.S. and British navies that are designed to dispense jamming and decoys. The appropriate functioning program can be entered into the projectile prior to launch based upon the data received from the acoustic systems. After entering the water, the projectile creates powerful noise jamming in the water in a wide band of torpedo acoustic frequencies.

An experimental model of the Spartacus surface combatant torpedo defense system was developed in France at the end of the 1980's. They proposed initiating its series production in the middle of 1992. This system consists of: a passive torpedo detection system and issuance of a "torpedo alert" signal; a countermeasures process control system and rocket-propelled projectiles with warheads in the shape of various types of sonar countermeasures instruments.

The torpedo detection system in its complete configuration consists of the Albatros sonar system with a flexible towed extended sonar antenna and U/RDT-1A (SPDT-1A) torpedo detection noise direction-finding equipment that operates from a DUBA-25 type hull-mounted acoustic system antenna.

The joint operation of these two systems provides continuous 360° surveillance of the situation in the passive mode, in the process, French experts note that the torpedo detection range can reach 10 or more kilometers with a torpedo DF accuracy of more than 10° under favorable acoustic conditions.

The U/RDT-1A acoustic system depicts noise spectral analysis data in time sequence on a color panoramic display and the noise frequency spectrum on a monochrome panoramic display.

The countermeasures processor control system is a data processing device of the nearby underwater situation, tactical situation depiction, data processing on the accomplishment of torpedo defense missions and control of the torpedo defense process. The following is carried out using a data processing unit: underwater situation information analysis on behalf of torpedo defense; target classification; calculation of the relative coordinates and the elements of movement of attacking torpedoes and target ranking based upon the degree of threat they pose to the surface combatant.

In the Spartacus system, a triangulation method jointly with carrying out coordinated inter-antenna signal processing from the bow and towed extended U/RDT-1A and Albatros sonar system antennas, respectively, is utilized to determine target coordinates and elements of movement. The system provides: automatic issuance of an alert signal based upon the results of the assessment of the tactical situation with its subsequent confirmation by the control panel operator; calculation of the availability, state, loading and readiness of torpedo defense systems and launchers to dispense decoys, and processes recommendations for maneuvering of the surface combatant and dispensing torpedo defense systems.

The following are depicted on the display: the mutual location of the attacking torpedoes and the surface combatant, the safe zone, and recommendations for maneuvering the surface combatant; state of loading the launchers with torpedo defense systems and the degree of readiness of the launchers and torpedo defense systems for employment.

Rocket-propelled projectiles with three types of sonar countermeasures systems have been developed for the Spartacus system:

—with a load in the form of a generator of consecutive explosive signals to suppress the sonar systems of the firing submarine and the torpedo's remote control channel;

—with a load in the form of water-reacting substance charges that create a powerful camouflage gas screen of small hydrogen bubbles between the attacking torpedo and the surface combatant-target during the process of the reaction with water; and,

—with a traditional electronic-acoustic load that ensures suppression of attacking torpedoes guidance systems using camouflage or diversion jamming.

A torpedo defense projectile is a 127 X 900-mm cylinder that weighs up to 50 kg. Maximum firing range is 3,000 meters.

The Spartacus system utilizes 1-2 Dagaie launchers to fire these projectiles. The onboard system consists of up to 30 rocket-propelled projectiles with different missions. Dagaie launchers are universal and have up to 10 launch rails that serve to launch various EW [electronic warfare] munitions, including sonar countermeasures devices. Sagaie launch canisters can also be adapted to fire torpedo defense projectiles.

After receiving the command to fire, the selection of torpedo defense projectiles is conducted for this situation and their automatic launch is carried out. During the terminal phase of the projectile flight trajectory, speed is reduced using a braking parachute, the projectile enters the water and the jamming devices begin to operate at the assigned depth. Their functioning time is 2-3 minutes and the gas curtain operating time is 8-10 minutes.

The Spartacus system's operating principle is depicted in Figure 1.

Thanks to modularity of design, the new torpedo defense system can be combined with a ship's submarine defense system and can be installed on various ships regardless of the equipment and acoustic weapons on them.

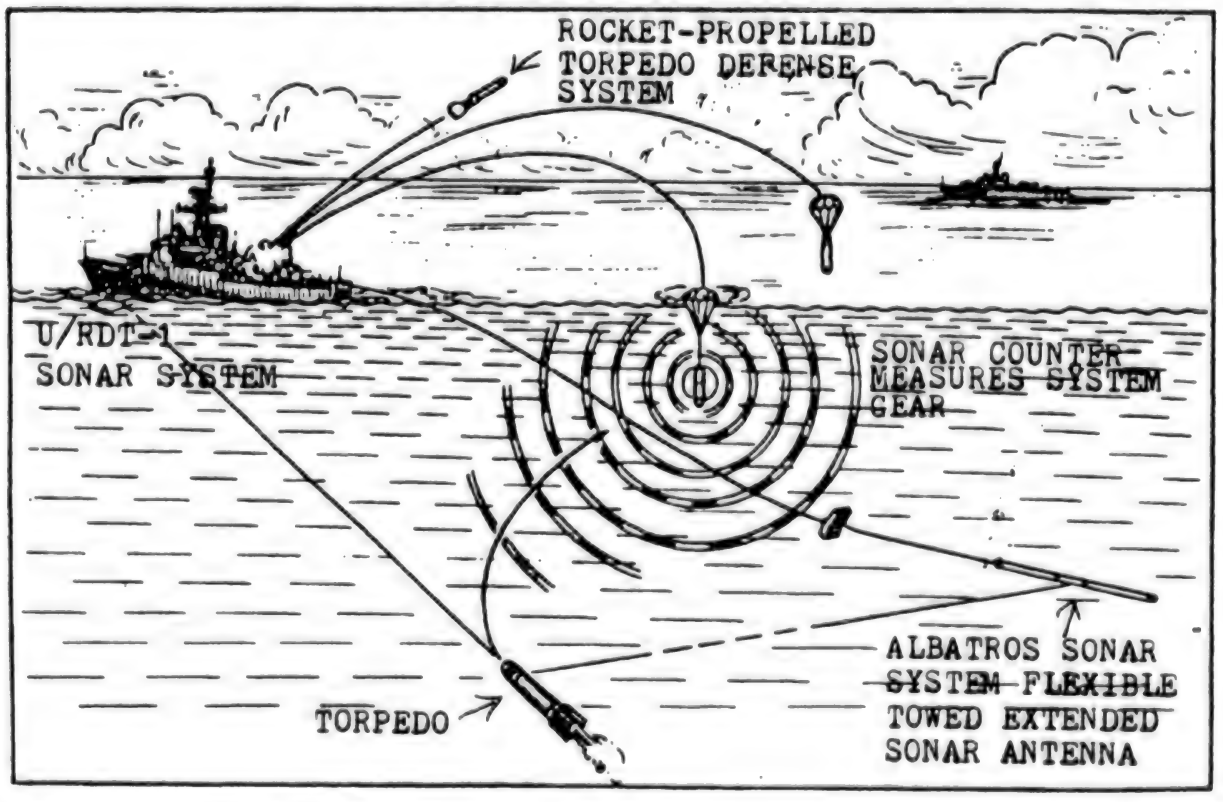
According to Western experts, the Spartacus system, despite the absence of torpedo destruction weapons in it, is sufficiently effective because it is thought that the mission of reliable detection, classification and localization of attacking torpedoes has been successfully accomplished during its development.

Tourville Class destroyers will be the first ships on which they plan to install this system because these ships are equipped with SLASM sonar systems that ensure detection of torpedoes (a low-frequency hull-mounted acoustic system, a medium-frequency acoustic system, and an acoustic system with towed flexible long linear sonar antennas).

Beginning in 1995, they propose installing some components of the Spartacus system on seven Georges Leygues and Cassard Class destroyers, and also on other French Navy surface combatants.

While considering the French Navy's extreme interest in equipping the aircraft carrier Charles De Gaulle with effective torpedo defense systems, the system's developing firms have been conducting research since October

Figure 1. The Operating Principle of the Spartacus Torpedo Defense System.



1990 to improve the Spartacus system for its subsequent installation on the aircraft carrier.

The foreign press has reported that the Israeli firm Rafael Armament has completed development of the ATC-1 (ATC—Anti-Torpedo Countermeasure) towed torpedo defense system during the second half of the 1980's. The firm notes that this system, thanks to its compact construction, can be installed both on the primary classes of surface combatants and also on merchant ships.

A "decoy" weighing approximately 25 kg, 120 cm long and 30 cm in diameter emits strong sound signals that create a false phase front, forcing the torpedo to move in the direction of the noise, completing in the process a series of consecutive attacks of the emitters until the total expenditure of its power source.

They also note that, thanks to its small dimensions, the ATC-1 does not impede the maneuvering of the ship-platform in course and speed and its installation does not require a great deal of area or space on the upper deck or in below decks spaces.

Since 1987, the ATC-1 torpedo defense system has been in series production by Rafael Armament in Haifa. It is important to note that the "decoy" was designed and tested in accordance with the MIL-E-16400 All-European Standard in the sphere of military electronics.

It is being reported that Sa'ar-5 class escort ships, which are being built for the Israeli Navy in the United States, are being equipped with ATC-1 decoys. The lead ship of this series was transferred to the Israeli Navy in 1993.

The primary tactical-technical specifications of foreign countries navies torpedo defense systems have been cited in the table.

Tactical-Technical Specifications of Foreign Countries Navies'

Designation of Model, Country, Code	Year of Acceptance Into the Inventory	Purpose	Operating Mode (Type of jamming)
1	2	3	4
1. Drifting Sonar Suppression Systems			
SSAWS [Surface Ship Acoustic Warfare System]. Drifting sonar countermeasures system, United States	Beginning of the 1980's	Suppression of sonar systems. Suppression of torpedo guidance. Deflecting torpedoes from surface combatants	Low frequency noise,————————. High frequency noise. Simulation of acoustic fields of surface combatants
Spartacus. Drifting sonar counter measures system, France	First half of the 1990's	Suppression of sonar systems. Suppression of torpedo guidance. Deflecting torpedoes from surface combatants	Explosive jamming. Gas curtain. Simulation of the acoustic fields of surface combatants
ATAAC [Anti-Torpedo Air-launched Acoustic Countermeasure]. Drifting torpedo decoy, Great Britain		Suppression of torpedo guidance system	High frequency noise
EX-10. Drifting torpedo decoy, United States	Second half of the 1990's	Suppression of torpedo guidance systems	
2. Surface Combatant Towed Torpedo Defense Systems			
AN/SLQ-25. Towed torpedo decoy, United States	1977	Deflecting torpedoes with passive, active and combined guidance from surface combatants	Continuous radiation in the CW mode. Continuous AM-noise. Pulse AM-noise. Continuous AM-noise + CW
AN/SLQ-25-A. Improved towed torpedo decoy, United States	1987	Deflecting torpedoes with passive, active and combined guidance from surface combatants	
AN/SLQ-36. Towed combined torpedo countermeasures system, United States	1987	Torpedo attack countermeasures and diversion of torpedoes with passive, active and combined guidance from surface combatants	
182M. Towed jamming device, Great Britain	1964	Suppression of submarine sonar complexes. Diversion of torpedoes with acoustic guidance systems from surface ships	Continuous AM-noise. Continuous CW radiation. Pulse AM-noise
181BB. Towed jamming device, Great Britain	End of the 1960's	Diversion of torpedoes with acoustic guidance systems from surface combatants	Simulation of the acoustic fields of surface combatants
GI 738 [TR Note: G 738]. Towed torpedo decoy, Great Britain	1977	Suppression of submarine sonar complexes. Diversion of torpedoes with acoustic guidance systems from surface combatants	
SEA SIREN. Towed torpedo decoy, Great Britain		Diversion of torpedoes with acoustic guidance systems from surface combatants	Continuous radiation in the CW mode. Continuous AM-noise. AM-noise + CW mode. Alternating AM-noise + CW mode. Pseudo-randon noise
TMK-6 Fanfare. Towed torpedo decoy	Middle of the 1970's	Diversion of torpedoes with acoustic guidance systems from surface combatants	Simulation of surface combatant noise
UNIFOXER. Towed torpedo decoy, the Netherlands		Diversion of torpedoes with acoustic guidance systems from surface combatants	Simulates the noise of surface combatants
CAAT. Towed torpedo decoy, Canada		Diversion of torpedoes with acoustic guidance systems from surface combatants	Simulates the noise of surface combatants
ATC-1 [Anti-Torpedo Counter measure]. Towed torpedo decoy, Israel	1986	Diversion of torpedoes with acoustic guidance systems from surface combatants	Simulates the acoustic fields of surface combatants
SSTADD. System to distort the initial acoustic field of a surface combatant, United States	1977	Deception of enemy submarine sonar system operators on the operational situation in the area, class and type of platform	Radiation of signals and noise

Surface Combatant Torpedo Defense Systems

Operating Frequency, kHz	Time of Operation, Minutes	Operating depth, meters, Towing speed, knots	Caliber, mm, Weight, kg	Additional Information
5	6	7	8	9
Range of noise jamming submarine sonar system. Torpedo guidance system range		/-		Stored on racks. Fired from special launchers. Loading —manual.
0.1-6—5-80—Torpedo guidance system range	Up to 8, up to 4-6, 2-3	/-	130/up to 50	Fired from Dagaie or Sagaie system general purpose launchers to the range.
Torpedo guidance system range	Up to 5	/-	Up to 3,800 meters, 76/. and 100/.	Connecting MGKh [hardware] are compatible with Shield type shipborne launchers
Torpedo guidance system range		/-		Being developed based upon the SSTD [Surface Ship Torpedo Defense] Program
17-88	No less than 72 hours	Up to 66/30	150/approximately 20	Primary subsystem of the SSAWS surface combatant torpedo defense system. Has AN/SLQ-26, -33, and - 51 modifications
Torpedo guidance system range				Developed during the 1st stage of the SSTD Program. New development to replace the AN/SLQ-25
				Developed during the 2nd stage of the SSTD Program
0.2-3.5, 19.5-80, 19.5-80	No less than 72 hours	Up to 36/24	533/74	
10-50	No less than 72 hours	Up to 75/15		
			533/74	Export variant of the 182M decoy
	No less than 72 hours			New generation of the 182M decoy
1-100	No less than 72 hours	Up to 65/30		
	No less than 72 hours	Up to 40/25		
10-35	No less than 72 hours	Up to 99/22		
			360/25	
0.2-3.5	Up to 26 hours			Realized the principles of reproduction of previously recorded noises of other types of targets or synthesis of "sound" portraits on a mixer by the operator

Nearly 10 years have passed since the day of the tragic loss of the Argentine Cruiser General Belgrano that was sunk by the British nuclear submarine Conqueror on 2 May 1982. But as before, the West considers the conclusion of SEKAY NO KANSEN Commentator Oh Rekhey [transliterated] to be timely... "Aren't the colossal expenditures on the construction of surface combatants senseless from the point of view of self-defense if we can sink these ships without hindrance..." That is why foreign navies are paying such serious attention to torpedo defense as a very important element of the self-defense of surface combatants and ships.

Today, it seems very important to painstakingly study leading foreign experience in the area of their effective defense from torpedoes when a new native concept of design and construction of surface combatants and ships is being developed.

Reorienting Formations

94UM0389H Moscow MORSKOY SBORNIK in Russian No 1, 1994 (Signed to press 28 Dec 93) p 79

[Article by Captain 1st Rank Yu. Makarov and Retired Captain 2nd Rank A. Chirkov: "Reorienting Formations"]

[Text] The discussion of the Navy's new strategic concept continued in the June issue of this magazine and the issues associated with the role of strike aircraft carriers, the development of a new type of combat formations and joint utilization of fleet aviation and the Marines were examined.

In the articles along with the proposal on the reduction of the number of active strike aircraft carriers, the opinion is being expressed on redesignating them as amphibious aircraft carriers. It is thought that these aircraft carriers must be part of the amphibious forces. Other authors advocate maintaining strike aircraft carriers as part of the fleet and propose ways to increase the combat capabilities of carrier task forces while supporting the operations of forces in coastal areas. So, 8th Special Purpose Group Commander Captain 3rd Rank Katan summarizes the experience of the utilization of a special purpose platoon that was on board the strike aircraft carrier "Saratoga" for four months (June-September 1992) as part of the 6th Fleet. On the aircraft carrier, this platoon accomplished combat training missions: search and rescue of personnel, search and capture of individual enemy facilities at sea and on the coast, special reconnaissance, guidance and adjustment of carrier-based aircraft strikes against enemy coastal facilities, and also peacekeeping functions and participation in the evacuation of the population. The missions cited were rehearsed in exercises and during the course of the carrier task force's daily activities on the Mediterranean Sea. Training of special purpose platoon personnel was conducted from an aircraft, a helicopter, from an aircraft and a helicopter simultaneously, and from a submarine.

Based on the experience obtained, the appropriate regulation was developed for the utilization of such groups that are permanently attached to aircraft carriers that are part of the 6th Fleet.

While proceeding from the new Naval concept that was set forth in the White Book, the naval forces command authorities view the development and utilization of the new operational-tactical unit, the so-called naval combat group—MBG—that is an elementary unit of U.S. sea power. A guided missile cruiser will become the nucleus of this unit. The guided missile cruiser's functions will include collection, processing and assessment of information based on data that is arriving from various sources to obtain a complete picture of the targets that are located in the region's air-surface-underwater space and making decisions on the utilization of electronic systems.

Besides the guided missile cruiser, the naval combat group is made up of ships with the Lamps system, a nuclear submarine and a base patrol aircraft. If necessary, they envision reinforcing the naval combat group with land-based reconnaissance aircraft, including AWACS. They think that this composition of the group will be capable of carrying out surveillance, issuing target designation to conduct strikes against assigned targets and conducting defensive operations in the water-air-land space in a 300-mile radius from the center of the group.

This group may be deployed in a potentially dangerous area, providing in the process antisubmarine defense, antiship missile defense and air defense and conducting airborne electronic reconnaissance. Coordination of operations will be carried out by a combined coordination center that is located on the guided missile cruiser. The availability of the naval combat group will substantially increase the combat capabilities of carrier forces, increasing the zone of their operations and expanding the circle of the missions being accomplished. This group can conduct delaying combat operations during the initial period and monitor the situation until the arrival of the carrier strike group or other forces. The naval combat group concept was proven during the course of two years (1990-1991) in the Mediterranean Sea.

The regulation developed based upon the concept of conducting combat operations by ground forces is the guiding document for the Marines. Its main idea consists of the joint utilization of air and ground Marine forces and fleet carrier-based aviation. Organizationally, this is expressed in the development of the functioning of an air-ground operational formation which must be rapidly deployed to the designated area to conduct combat operations.

This operational formation is capable of accomplishing air support missions, including providing direct air support and also of conducting missile-bomb strikes against enemy rear services facilities. They propose including

combat aircraft and helicopters and also ground-based subunits to accomplish the assigned missions.

A reassessment is being conducted of the possibilities for the utilization of carrier-based aviation as a result of the development of Marine air-ground operational formations. So, the opinion is being expressed that during operations in coastal areas, it must accomplish the following missions: support ground operations by achieving air superiority air in the designated area; conducting strikes against enemy fixed targets that are located in the rear area and also providing direct air support to ground forces.

The authors of the articles think that the new Marine doctrine provides the initiative in the conduct of combat operations to aviators, which will certainly increase the effectiveness of the employment of ground forces.

PRC Naval Forces Described

94UM0391H Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) pp 76-82

[Article by Capt 3d Rank M. Shepovalenko based on foreign publications: "'The Great Wall of Steel' (Present Status and Prospects of Development of the PRC Navy)"]

[Text] The Chinese People's Republic is one of the oldest sea powers, one possessing the experience and possibilities for building almost all classes of ships. It has also developed the concept of using its naval forces to defend national interests.

The origins of the Naval Forces of the People's Liberation Army of China (VMS NOAK)—such is the official name of the Chinese naval fleet—date back to 1954, when the Soviet Navy started transferring submarines, destroyers, patrol escorts, minesweepers and torpedo boats to it. Some of these ships were assembled at Chinese ship building plants on the basis of our technical documents, and out of parts, structures, units and machine units we supplied. Later on the Chinese began copying a number of Soviet ship designs with the technical assistance of our specialists. This went on for almost a decade, which may be considered to be the first stage in development of Chinese warship construction.

After Sino-Soviet relations "went cold" in the mid-1960's and our specialists were called back home, the Chinese leadership found itself facing the need for developing this sector of industry on its own. The period from the second half of the 1960's to the early 1980's is the second, transitional stage of the navy's development. It was characterized by construction of ships and submarines that were a further development of Soviet designs.

The mid-1980's were marked by entry of Chinese ship building into its third, modern stage. Its typical traits are: a quest for new concepts, and extensive development and implementation of original designs of warships and auxiliary vessels of various classes.

The "Program of Balanced Development of the Navy to the Year 2000" was developed in the PRC on the basis of the strategy of "coastal oceanic defense" adopted in 1989. Several programs are being implemented in parallel today in accordance with this strategy. Construction of submarines—both nuclear-powered and diesel-electric—is considered to be a priority direction in this case.

Development and construction of "Xia" class SSBNs (type 092) is an important accomplishment of Chinese ship builders. It was laid down in 1978, and launched on 30 April 1981; however, difficulties arose later on in "perfecting" the missile system launching 'Julang-1" SLBMs. The first launching of this missile from an experimental submarine in 1985 was unsuccessful, and it was not until September 1988 that a test launch was graced with success. This was, moreover, after the SSBN had already been introduced into the navy (Figure 1).

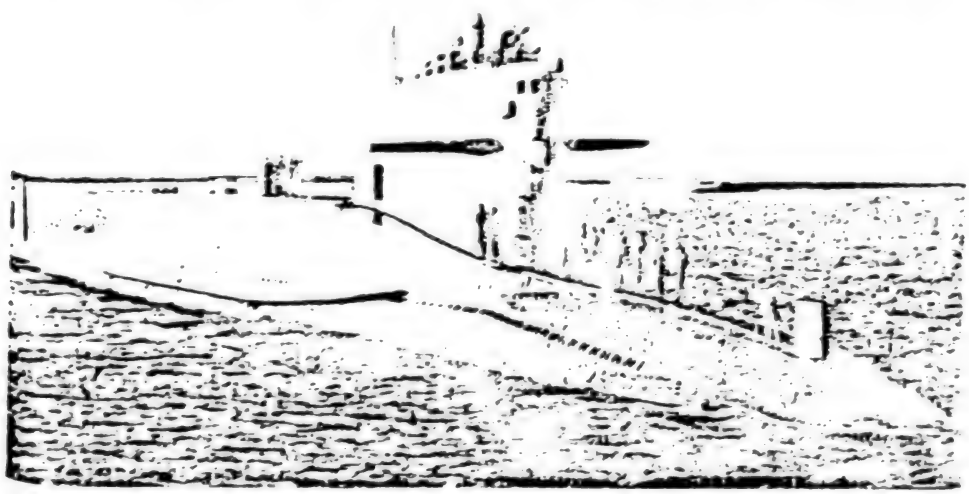


Figure 1. "Xia" Class Nuclear-Powered Ballistic-Missile Submarine

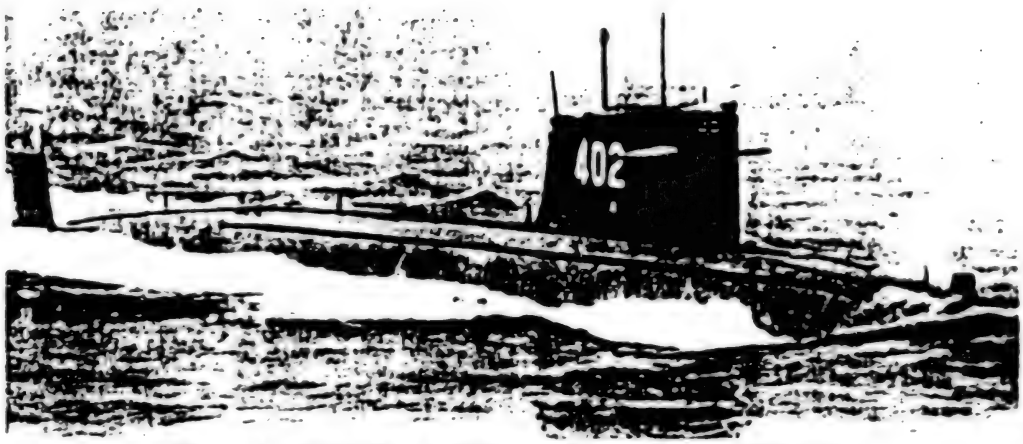


Figure 2. "Han" Class Multipurpose Nuclear-Powered Submarine

It is considered that the SLBM "Julang-1" (CSS-N-3 according to the Western classification) is outfitted with a single 2-megaton nuclear warhead. However, the level of development of Chinese missile technology, which was sufficient for the launching of three satellites to different orbits simultaneously by a single launch vehicle in 1981, provides the grounds for supposing that this SLBM may be fitted out with a multiple warhead. The possibility is not excluded that "Xia" class SSBNs will be re-armed in the second half of the 1990's with a new missile system launching "Julang 2" (CSS-NX-4) SLBMs, presently under development.

Despite the fact that the "Xia" class SSBN is inferior to similar American, British, French and Russian submarines in level of technological execution and performance characteristics, its introduction into the navy marks the beginning of creation of the sea component of the triad of Chinese strategic nuclear forces. Deployment of SSBNs in the Yellow and East China seas significantly raises China's military potential, and can significantly influence the strategic situation in the Asia-Pacific region.

It was believed for some time that the lead SSBN would be followed by three to five similar submarines to permit maintenance of a normal combat patrol cycle. However, the fact that this submarine is still the only ship of its class indicates that it is experimental, and that it is being operated in order to acquire experience in the combat use of naval nuclear forces, and to perfect the design to permit construction of a series of SSBNs of a new class (type 094). It is expected that they will possess 16 launchers for higher-range SLBMs, and that construction will begin in the second half of the 1990's.

Construction of the "Han" class multipurpose nuclear-powered submarine (Figure 2), which was started in the first half of the 1970's, is continuing as well. There are presently five such submarines in the fleet's force composition. According to reports in the Western mass media a number of design shortcomings were revealed in the lead submarine of this class, including in the nuclear reactor reliability system. Also, its noise level was high, and the effectiveness of external lighting and weapon control systems was low. Consequently, improvements were made in ships of this class beginning with the third hull. The design of the propulsion unit was improved. "Ying-ji-1" anti-ship missile launchers firing from surfaced position were installed behind the bridge, and the sonar system was modernized, with the French DUUX-5 sonar system at its basis. However, feeling that launching anti-ship missiles from surfaced position would sharply increase the submarine's vulnerability, the command of the VMS NOAK is considering, as one of the priority directions in this issue, arming them with anti-ship missiles launched from torpedo tubes. According to reports in foreign military periodicals, Chinese representatives conducted negotiations with a number of Western companies with the goal of acquiring some weapon systems, state-of-the-art external lighting systems, and technical documents for their subsequent production under a license. They include the MINICIN inertial navigation system and the Pivair (SPS) periscope with conventional and infrared observation channels produced by France's Sazhem [transliteration], and a sonar system with a long towed antenna manufactured by America's Westinghouse. Of course, in view of aggravation of American-Chinese relations at the turn of this decade and the fear the Americans have of losing their technological leadership, conclusion of the last deal is rather problematic.

An orientation on the French SSBNs "Le Redoubtable" and "L'Inflexible" and "Rubis" class nuclear-powered submarines is noticeable in the design of "Xia" SSBNs and "Han" nuclear-powered submarines respectively. Similarities include the hull lines, the propulsion unit and propeller, and the arrangement of the weapon systems. And the choice of the external illumination and weapon control systems with which to modernize them, which are once again French-made, is another indication of continuing cooperation between the PRC and France in development of China's nuclear-powered submarine fleet. In this case, in addition to significant attention to building nuclear-powered submarines, in the opinion of Western specialists

China's main efforts will be concentrated now and in the next decade on modernizing diesel-electric submarines, which represented 92 percent of the submarine forces of the VMS NOAK at the beginning of the present decade.

The most numerous among them are the "Romeo" class submarines created on the basis of technical documents for the type 633 Soviet medium submarine. They were built in two large series: in the 1960's (type 031—the base modification ES3B) and in the first half of the 1980's (type 033, improved). However, these ships have also grown obsolete, and despite the fact that the more up-to-date French DUUX-5 sonar system was installed in the last submarines of the second series, in the estimation of specialists their ASW capabilities are rather limited on the whole. Moreover they are starting to be actively transferred to the reserves in connection with expiration of their useful life. Consequently, in the 1970's China began building new "Ming" class (type 035) submarines. In this case three submarines of the first modifications (ES5C and ES5D) of this class were built in 1970-1979. And such a slow pace of their creation permits the supposition that Chinese specialists encountered serious technical problems. This is also confirmed by the fact that construction of "Ming" class submarines was suspended for a certain time, and construction of "Romeo" class submarines was resumed. It was not until 1987 that construction of "Ming" class submarines was resumed, but only two such ships of the new ES5E modification were created.

In the opinion of specialists this is associated with the fact that the "Romeo" submarine type long exhausted the possibilities for further modernization. Which is why a new submarine (type 039) is being planned. It is being developed on the basis of the French "Agosta" class submarine. Its construction and commissioning are possible in the second half of the 1990's. It is anticipated that its hull will have a drop shape, and its lines will resemble those of the "Albacore" class. While the main dimensions and displacement are comparable with "Ming" class submarines, there are plans to increase the radius of operations of the new submarine, its diving depth, its submerged speed and the power of the propulsion unit. The submarine will probably have a single shaft, which together with the improved hull lines will help to reduce its noise.

By the way, although noise reduction occupies one of the important directions of work in Chinese submarine building, this is not a priority objective at this stage. This is explained by the fact that the relatively shallow and warm waters of the seas adjacent to the Chinese coast significantly complicate antisubmarine warfare, and thus significantly reduce the effectiveness of modern ASW forces of the navies of the world's leading countries in these regions. The current concept of the use of the VMS NOAK does not presently foresee the navy's emergence onto the ocean, which is something for the more remote future.

Construction and commissioning of a number of surface ships of a new generation was typical of China in the late 1980's and early 1990's. Thus, the "Luhu" class guided missile destroyer (type 052), which was transferred to the navy in 1993, is the first ship of this class of specifically Chinese design. It is the most powerful warship ever in the force composition of the VMS NOAK. The destroyer is well armed in antiship and antisubmarine respects, including with antiship missile system launchers, as well as modern electronic systems. Design deficiencies include the relatively weak surface-to-air armament: Although the short-range Crotale Navale-PDMS surface-to-air missile system and four 37-mm twin H/PJ-76A guns provide reliable air defense for the ship, it still is point defense. It has a combined diesel and gas turbine propulsion unit, which together with the smooth hull lines and modern superstructure architecture significantly improves its seagoing qualities and endurance.

According to the handbook *Jane's Fighting Ships* the lead ship will be followed by a second destroyer. The possibility is not excluded that construction of the series will end with this, and the operating experience will be accounted for in developing the design of a new guided missile destroyer in the second half of the 1990's.

"Luda" class (type 051) guided missile destroyers are currently undergoing modernization, during which they are to be equipped with the French THOMSEA ASBU [automated tactical control system], which includes the TAVITAC BIUS [combat information command and control system] and the Vega missile and artillery fire control system. New radar and sonar, radiotechnical and ECM systems, a navigation system and a communication equipment outfit produced in China on the basis of licenses from a number of French firms are also to be installed (Figure 3).

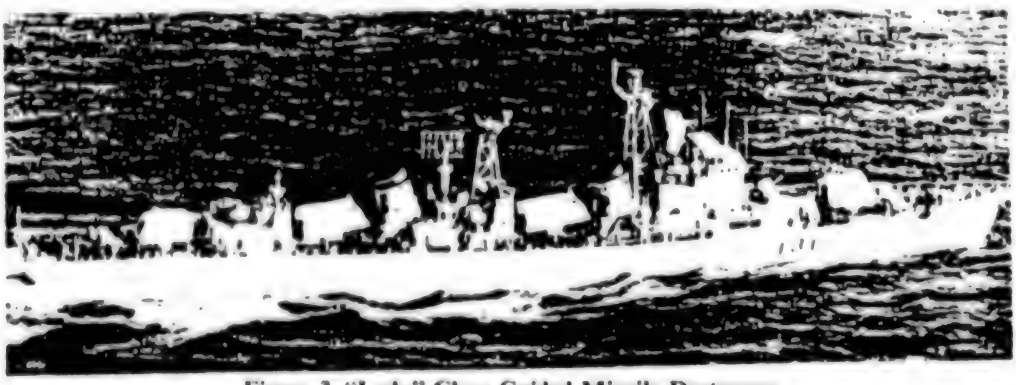


Figure 3. "Luda" Class Guided Missile Destroyers

Destroyers ("Luda-III" class) are armed with new ASM systems—four twin launchers of the Ying-ji-1 ASM system (the bow twin launcher of the ASM system is adapted for launching SU-1 antisubmarine missiles). New 37-mm twin turret guns are installed in place of four 25-mm and four 57-mm deck guns. Antisubmarine armament was also reinforced with the installation of two 324-mm triple-tube type B515 torpedo launchers firing A244S torpedoes. New electronic equipment was also installed aboard the destroyer: a towed variable-depth sonar system, and airborne and surface target detection and fire control radar, developed on the basis of Western models. The stern 130-mm and 57-mm twin gun mounts on ships undergoing modernization under the "Luda-II" project are being dismantled, and replaced by a helicopter pad and a hangar for two Zhi-9A helicopters and a SAFECOPTER takeoff and landing support system.

Construction of "Luda" class guided missile destroyers obviously came to an end with introduction of the "Zhuhai" guided missile destroyer into the force composition of the navy no later than 1993.

Construction of new "Jiangwei" (type 055) guided missile escort ships is continuing. The lead ship was placed within the force composition of the navy in late 1992. In terms of the level of automation and availability of different weapon systems and electronic resources this escort ship is the most up-to-date ship of its class. It carries a six-container Hongqi-61M SAM system launcher (an improved version of the Hongqi-61 system). The aft Ying-ji-1 ASM launcher group is possibly adapted for launching SU-1 antisubmarine missiles. Another two "Jiangwei" class guided missile escort ships are presently in different stages of construction, and the series will number a total of four to six units.

Beginning in the mid-1980's China started modernizing "Jianghu" class (type 053) guided missile escort ships. The hull structure was changed on escort ships modernized as the "Jianghu-III" version (type 053HT): A twin deck bearing four stationary Ying-ji ASM launchers was added; the number of 37-mm twin gun mounts was reduced from six to four. The outfit of electronic equipment was supplemented by a Chinese ASBU, a early-warning aerial observation radar, ASM system and universal-caliber artillery fire control radar, light AAA fire control radar, and radiotechnical and ECM systems. The lattice mast was replaced by a tower. There are presently two "Jianghu-III" class guided missile escort ships in the force composition of the VMS NOAK.

In early 1993 a "Zhoushan" guided missile escort ship of the new "Jianghu-IV" modification was transferred to the navy. It differs from series "Jianghu-III" ships in having a somewhat altered ASM launcher, which is associated with adoption of a modified variant of the Ying-ji-1 ASM of greater firing range. The second guided missile escort ship of the "Jianghu-IV" class was launched in 1992.

The guided missile escort ship "Siping", which was finished as the "Jianghu-II" version (type 053HT(H)), was transferred to the navy in 1986. Together with the "Luda-II" modification of the "Jinan" guided missile destroyer, it became the first helicopter-carrying escort ship within the VMS NOAK.

The design of the ship's hull from the first ASM launcher to the stern was altered with the purpose of installing a helicopter pad and hangar: A helicopter deck was added, the second ASM launcher was dismantled, and the shape and height of the falshtruba [false stack?] were changed. Changes were made in the armament: A French one-barrel 100-mm Creusot Loire gun mount and two type ILAS triple-tube 324-mm torpedo launchers firing A244S torpedoes were installed. The outfit of electronic equipment was supplemented by the French NAJA electron-optic sight for fire control of the 100-mm gun mount, the SAFECOPTER helicopter takeoff and landing support system, and two launchers firing Mk.33 SRBOC passive jamming munitions. The ship carries one Zhi-9A helicopter.

Modernization efforts on other "Jiangu" class guided missile escort ships of the basic plan have been limited up until now to replacement of the single-barrel 100-mm gun mounts by twin gun mounts of the same caliber, and installation of early-warning aerial observation radar, as well as fire control radar for two twin 100-mm guns. Fire control radar for four 37-mm twin gun mounts was installed aboard some ships.

Modernization of the "Jiangdong" class (type 053K) guided missile escort ship was started in 1992. There are plans to install Western-made modern weapon systems and illumination resources or their Chinese analogues aboard these ships.

New escort ships—the "Luhu" class guided missile destroyer and the "Jiangwei" class guided missile escort ships—were initially planned and built as helicopter carriers. The former carries two and the latter carries one Zhi-9A helicopters, which are the Chinese version of the French Dauphin-2 helicopter. The armament of the Zhi-9A helicopter includes Italian A244 antisubmarine torpedoes or American Mk.46 Mod.2 torpedoes, French HS-12 submersible sonar systems, and a magnetometer. The helicopter can be equipped with four ASM for action against surface ships.

Two ship-based Ka-27 helicopters acquired in Russia were transferred to the navy in 1993 for testing and evaluation. If they exceed the Zhi-9A in their performance characteristics, China may purchase an additional lot of Russian helicopters, or the license to manufacture them.

The "Houjian" class (type 520) small guided missile ship was built and transferred to the navy in July 1991. The new small guided missile ship carries strengthened missile and artillery armament, which is twice greater in comparison with existing classes of long-range warships. It is intended for action against surface ships on the

outer perimeter of the seas contiguous with continental China. In the future it is to be outfitted with PL-9N close-range surface-to-air missile systems. From all appearances it is an experimental platform intended to study the problems of combat use of small guided missile ships and to check the effectiveness of new models of armament and equipment installed aboard them.

The "Houxin" class (type 037-II) small guided missile ship is the missile variant of the "Haijui" class small ASW ship. The lead ship was placed in the force composition of the navy in 1991. There are five such small guided missile ships in the force composition today, and another three are in different stages of construction. The rate of construction is three ships a year. Introduction of such small guided missile ships into the navy will make it possible to partly compensate for transfer of obsolete "Hegu" and "Huoku" class missile boats and their subsequent retirement.

In 1992 the navy began receiving LSM class small amphibious warfare ships of a new design. With a displacement of 600 tonnes, their loading capacity is 150 tonnes and they can be used to land personnel and tracked and wheeled equipment on an unimproved coast, and supply ammunition and provisions to troops. In distinction from small amphibious warfare ships built earlier, the ship's superstructure is shifted from the stern closer to the middle, which improved its controllability and seagoing qualities. The ship's artillery armament includes bow and stern 25-mm twin automatic guns. The cruising range is around 1,000 miles at a speed of 12 knots. It is anticipated that by the end of 1993 there will be not less than three small amphibious warfare ships of this class in the navy's force composition.

By the second half of the 1980's the minesweeping forces of the VMS NOAK were considerably worn and obsolete. They now possess insignificant possibilities for laying and sweeping mines.

Class T-43 (type 010) ocean minesweepers, built in China in the second half of the 1950's on the basis of Soviet technical documents, reached the limit of their useful life by the mid-1980's. And in connection with the absence of a new design of a mine warfare ship, the naval command decided to resume their construction.

Beginning in 1988 the navy started receiving "Wosao" class coastal minesweepers. By now there are five coastal minesweepers of this class in the forces, and another three ships are in different stages of construction. The rate of construction is one ship a year. The new minesweeper carries two types of acoustic (sonic and infrasonic), electromagnetic and small contact sweeps, and it is armed with two 25-mm twin automatic guns. Its hull is made from steel with low magnetic properties. The coastal minesweeper can also be used as a harbor and a river minesweeper. It will replace the "Fushun" and "Lienyun" minesweepers, refitted correspondingly out of "Shanghai-II" patrol boats and fishing trawlers.

The long-range plans for developing minesweeping forces foresee construction of a new class of mine warfare ships by the mid-1990's—minehunters. Chinese developments in this area are complicated by the absence of modern mine detection and sweeping resources, in connection with which Chinese specialists intend to turn to foreign developers. There are plans for basing the design on the Italian "Lerici" class minehunter. Nor is cooperation with England's Vosper Thornycroft excluded. Negotiations were conducted with it on this matter by the Chinese side in 1988. There are also plans to make foreign purchases of mine-seeking sonar and sweeping equipment with the right of its licensed production.

In 1988 the "Bieliejian" class minelayer was transferred to the navy as the lead ship in a series of three units. With a displacement of over 1,000 tonnes, it has bow and stern mine holds, each of which is equipped with a crane, and side ports for the mine tracks are located on the stern transom. The artillery armament of the ship consists of four 37-mm twin gun mounts.

Construction of the "Hainan" class small ASW ship (type 037), which began in 1963-1964, is continuing (it is based on our type 201 ASW launch). A number of changes were made in the basic design: The single mast was replaced by a tripod, a surface target detection radar was installed on it, and underwater illumination resources were supplemented with a French SS-12 variable-depth towed sonar system. A similar sonar system is also being installed aboard "Haujui" class (type 037-1) small ASW ships, which are a further development of the "Hainan" design. The numerical strength of fleet forces of the VMS NOAK is shown in the Table.

Fleet Forces of the VMS NOAK as of 1 January 1994

Ship Class and Type	Fleet Forces	Reserves	Under Construction (Modernization)
Warships of the Main Types	300	Over 110	10(1)
Submarines:	36	Over 51	
"Xia" class SSBNs	1	-	
"Han" class nuclear-powered submarines	5	-	-
diesel submarines	30	Over 51	-
Surface Ships	264	59	-
"Luhu" class guided missile destroyers	1	-	1
"Luda-III" class guided missile destroyers	1	-	-
"Luda-II"	1	-	-
"Luda-I"	14	-	-
"Jiangwei" class guided missile escort ships	1	-	1
"Jianghu-IV"	1	-	1
"Jianghu-III"	2		-
"Jianghu-II"	1	-	(1)
Other classes	5	1	-
Escort Ships	5	-	-
"Hojian" class small guided missile ships	1	-	-
"Houxin" class small guided missile ships	6	-	2
Small ASW ships	97	-	3
Amphibious warfare ships	63	2	-
Minesweeping ships	63	56	2
Combatant Craft:	Over 527	Over 550	5
Missile	Over 150	Over 60	-
Torpedo	Over 90	Over 50	-
Patrol	Over 127	Over 240	5
Amphibious warfare	Over 160	Over 200	-

Thus construction of warships of a new generation and modernization of ships within the force composition of the navy since the 1970's indicate transfer of the line of detection of the probable enemy and of fire effect upon him from coastal waters to the outer perimeter of the seas bathing continental China. However, in terms of their combat capabilities these ships still cannot be considered to be ocean-going ships.

A shortage of financial resources will obviously prevent the VMS NOAK from initiating large-scale series construction of new ship designs in the immediate future; most probably ships will be built in small series with the goal of testing and evaluating new weapons and illumination systems. Priority in developing surface forces will obviously be given to creating escort ships such as guided missile destroyers with ASM systems providing zonal air defense, and guided missile escort ships with specialized antisubmarine armament. Mine warfare ships armed with modern mine warfare resources will also enjoy further development.

Evaluating the prospects for developing the navy's light forces, it should be noted that construction of new missile and torpedo boats is not currently proceeding. Launches of these types within the fleet forces of the VMS NOAK satisfy modern requirements in general, but a significant number of them are worn, and require replacement.

In the second half of the 1980's China continued construction of "Huangfen" class missile boats (type 021), making changes in the composition of the missile and artillery armament: Eight (four twin) or six (two twin stern and single bow) stationary Ying-ji-1 ASM launchers were positioned on the sides of the boats in place of four Feilong-2 ASM launchers, and 30-mm twin gun mounts and fire control radar were installed in place of the bow and stern 25-mm twin automatic guns. The outfit of electronic equipment was supplemented by radiotechnical and ECM resources.

The transition to building small missile ships, however, does not mean rejection of further development of the small-displacement type of missile boats. Thus, in an international arms exhibition in Abu Dhabi in February 1993 the Chinese delegation displayed plans for a small missile boat 31 m long with a 118 tonne displacement, armed with four Ying-ji-1 ASM launchers and a single-barrel 76-mm turret gun, the Oto Melara Super Rapid. In comparison with the "Hegu" and "Huoku" missile boats, this one is equipped with improved electronic equipment, and it has a propulsion unit with a greater power reserve (two diesel engines manufactured by Germany's MTU).

New "Huludao" and "Huxin" patrol boats are continuing to enter the fleet forces of the VMS NOAK and river forces of the border troops of the People's Armed Militia.

The "Huludao" class gunboat is a reduced version of the "Barkat" gunboat (Chinese-made), which is operating with the coastal defense forces of Pakistan. The boat's displacement was reduced from 400 to 180 tonnes, with no change in its overall layout. In contrast to the Pakistani model, the artillery armament of the new boat is limited to bow and stern 14.5-mm automatic guns (type 81). The boat's radius (1,000 miles under economical power) allows it to effectively patrol the 2,000-mile economic zone. The navy possesses four gunboats, and a fifth is under construction.

The "Huxin" class river gunboat is a modification of "Hapu" class boats. It has a higher freeboard and an altered superstructure configuration. Series production

of the new boats began in 1989. There are currently eight "Huxin" class gunboats in operation, and another four are nearing completion.

Thus presence of a large grouping of combatant craft in the present stage (over 500 units) generally permits successful completion of the missions of fighting surface ships and maintaining favorable operating conditions in China's coastal zone.

New Mines Respond to Ship Seismic Field

94UM0391I Moscow MORSKOY SBORNIK in Russian No 2, 1994 (Signed to press 8 Feb 94) pp 85-86

[Article by Capt 2d Rank V. Kamenev, cand tech sci, and Capt 1st Rank (Ret) A. Votyakov, cand tech sci, docent: "Seismic Mine Firing Mechanisms"]

[Text] Many countries of the world—the USA, Germany, Great Britain, France, Italy, Japan and others—are undertaking significant efforts to improve mine weapons because, in the opinion of specialists, mobility, covertness of their placement, selectivity of destruction and the possibility of a prolonged effect upon the enemy during war raises them to the rank of strategic weapons.

Mines are also viewed as a variant of psychological and economic weapons, finding wide use in naval operations and local conflicts. The navies of many countries possess a substantial arsenal of mines and a sufficient number of carriers for their mass use, beginning with shallow coastal and ending with deep remote regions of the world ocean.

Recently, the "countenance" of mine weapons changed significantly in connection with use of the latest advances in science and technology. Microprocessor technology, capable of quickly analyzing and processing a large volume of information, has come to be used extensively in mine initiation, targeting and detonation systems. Progress in development of such systems also made it possible to put nontraditional fields to work, ones which had not been utilized earlier to create proximity firing mechanisms for mines.

Being a material body, a ship is known to be the carrier of a number of physical fields (magnetic, acoustic, hydrodynamic, seismic and so on). By its presence it unavoidably creates certain distortions in most natural physical fields, to which proximity systems of mine weapons react, isolating a useful signal from these distortions, to be used for analysis and to activate its devices. We will dwell here only on use of the seismic field for these purposes.

A ship's seismic field is secondary, and it is formed in the material of the sea-bed in response to the ship's hydrodynamic and hydroacoustic fields. Therefore, the corresponding sensitive elements of such mines evaluate and analyze the features of this field with the purpose of revealing perturbations introduced into the material of the sea-bed as a result of the presence of a ship or vessel in a particular region.

Figure 1 is a basic model of how a ship's seismic field is generated. It shows formation of a system consisting of a chain of elements that generate and shape the signal: the source of oscillations (the ship), the water column, an elastic medium (the sea-bed material), and a receiver (a mine with a seismic proximity firing mechanism). It is arbitrarily referred to by specialists as a complete seismic channel. A block diagram of a complete seismic channel is shown in Figure 2.

The sum of characteristic signals of some force in a certain frequency band forms at the source of the oscillations. These oscillations transmit a perturbing effect through the water column to an elastic medium (the sea-bed material), evoking a seismic wave, which reaches the location of the mine and its seismic proximity firing mechanism. After the logical circuit analyzes the obtained information and compares it with a set of standards, the firing mechanism "makes the decision" regarding destruction of the object (target).

Judging from communications in the foreign press, mines equipped with seismic firing mechanisms began appearing in the ground forces of the USA and then in other armies in the 1960's. Sea mines appeared in the 1970's. They came to be used widely together with land models in shallow water, especially in anti-assault landing minefields.

Figure 1. Basic Model Showing Formation of a Ship's Seismic Field

Key: 1—ship (the field source); 2—aquatic environment; 3—ship's hydrodynamic field; 4—ship's hydroacoustic field; 5—sea-bed material; 6—ship's seismic field; 7—seismic proximity firing mechanism

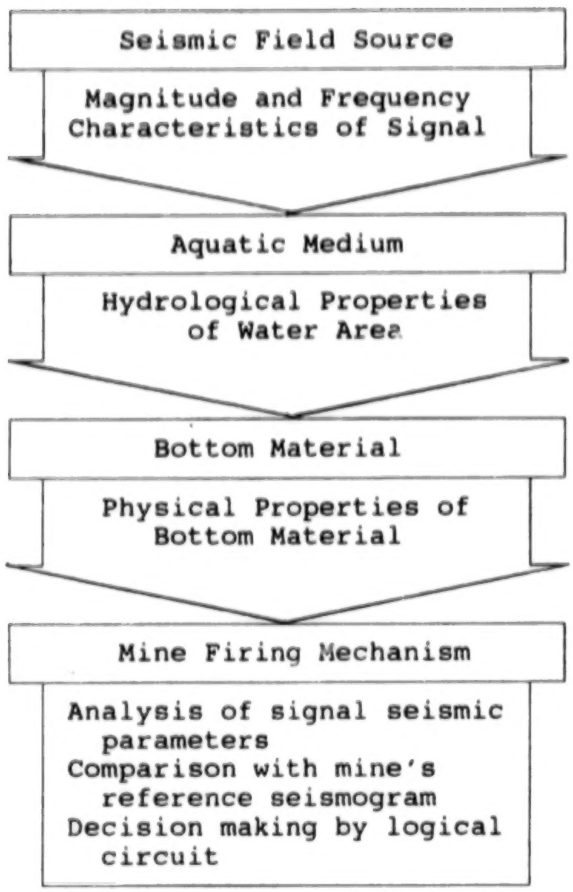


Figure 2. Block Diagram of a Seismic Channel

The advent of such proximity firing mechanisms was brought on by:

- the high speed with which seismic waves spread through the material of the sea-bed, owing to which the corresponding receiver could detect the ship's motion with some lead time, thus increasing the time the mine's equipment has to analyze the received signal in order to classify the object;
- presence of a number of unique characteristics of seismic waves, which in contrast to hydroacoustic waves for example, make it possible to develop proximity firing mechanisms that are more resistant to interference;
- the possibility of using geophysical methods for analyzing the signals—their grouping, correlation analysis and so on, making it possible to employ effective means of isolating the useful signal from the background of interference of natural (microcircuit) and artificial (explosions) origin.

The basic characteristics of mines of the world's leading countries with proximity firing mechanisms containing seismic channels are shown in the Table.

Mines with a seismic firing mechanism present the greatest danger because, on one hand, they are buried in the ground as a rule, which makes finding and destroying them much harder and less effective, and on the other hand, they also have other back-up forms of firing mechanisms. Intensive development of such mines is making it necessary to study the fine structure of a ship's seismic field more carefully, and to seek ways and means of fighting these mines.

Model, Country	Mine Type	Weight, kg		Laying Depth, m	Type Proximity Firing Mechanism
		Total	Explosive		
Mk 62, USA	Quickstrike mine-bomb	241	87	Up to 425	Mk 57 (M+S)
Mk 63, USA	"	483	214	Up to 30	Mk 57 (M+S) or Mk 58 (M+S+HD)
Mk 64, USA	"	921	430	Up to 45	"
Mk 65, USA	"	900	500	Up to 100	"
MOWAM, USA	mine-bomb	195	-	3-60	" (M+S+A)
BLU-94/B, USA	"	-	-	Shallow water	Mk 57 (M+S) or Mk 58 (M+S+HD)
Mk 67, USA	Bottom	750	150	Up to 100	" (M+S)
MLV-10/B, USA	Antitank	-	-	Up to 2	"
BLU-31/B, USA	"	-	-	"	"
Miff, FRG	"	3	0.9	"	S
SB-MV, Italy	"	5	2	"	"
LASSO, FRG	Horizontal effect antitank	10.8	6.8	"	S+A
ERAM, USA	"	30	2.5	"	S+A

Note: M—magnetic firing mechanisms; A—acoustic; HD—hydrodynamic; S—seismic

Foreign Broadcast Information Service (FBIS) and Joint Publications Research Service (JPRS) publications contain political, military, economic, environmental, and sociological news, commentary, and other information, as well as scientific and technical data and reports. All information has been obtained from foreign radio and television broadcasts, news agency transmissions, newspapers, books, and periodicals. Items generally are processed from the first or best available sources. It should not be inferred that they have been disseminated only in the medium, in the language, or to the area indicated. Items from foreign language sources are translated; those from English-language sources are transcribed. Except for excluding certain diacritics, FBIS renders personal names and place-names in accordance with the romanization systems approved for U.S. Government publications by the U.S. Board of Geographic Names.

Headlines, editorial reports, and material enclosed in brackets [ ] are supplied by FBIS/JPRS. Processing indicators such as [Text] or [Excerpts] in the first line of each item indicate how the information was processed from the original. Unfamiliar names rendered phonetically are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear from the original source but have been supplied as appropriate to the context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by the source. Passages in boldface or italics are as published.

SUBSCRIPTION/PROCUREMENT INFORMATION

The FBIS DAILY REPORT contains current news and information and is published Monday through Friday in eight volumes: China, East Europe, Central Eurasia, East Asia, Near East & South Asia, Sub-Saharan Africa, Latin America, and West Europe. Supplements to the DAILY REPORTs may also be available periodically and will be distributed to regular DAILY REPORT subscribers. JPRS publications, which include approximately 50 regional, worldwide, and topical reports, generally contain less time-sensitive information and are published periodically.

Current DAILY REPORTs and JPRS publications are listed in *Government Reports Announcements* issued semimonthly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 and the *Monthly Catalog of U.S. Government Publications* issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The public may subscribe to either hardcover or microfiche versions of the DAILY REPORTs and JPRS publications through NTIS at the above address or by calling (703) 487-4630. Subscription rates will be provided by NTIS upon request. Subscriptions are available outside the United States from NTIS or appointed foreign dealers. New subscribers should expect a 30-day delay in receipt of the first issue.

U.S. Government offices may obtain subscriptions to the DAILY REPORTs or JPRS publications (hardcover or microfiche) at no charge through their sponsoring organizations. For additional information or assistance, call FBIS, (202) 338-6735,or write to P.O. Box 2604, Washington, D.C. 20013. Department of Defense consumers are required to submit requests through appropriate command validation channels to DIA, RTS-2C, Washington, D.C. 20301. (Telephone: (202) 373-3771, Autovon: 243-3771.)

Back issues or single copies of the DAILY REPORTs and JPRS publications are not available. Both the DAILY REPORTs and the JPRS publications are on file for public reference at the Library of Congress and at many Federal Depository Libraries. Reference copies may also be seen at many public and university libraries throughout the United States.

END OF FICHE DATE FILMED

4 AUG 94